DAILY EDITION

American Gas Journal

Formerly American Gas Light Journal

EST. 1859

VOL. 117. NO. 20
WHOLE NO. 3375

NEW YORK, THURSDAY, OCTOBER 26, 1922, ATLANTIC CITY, N. J.

Subscription $3 per year
$4 Canada $5 Foreign

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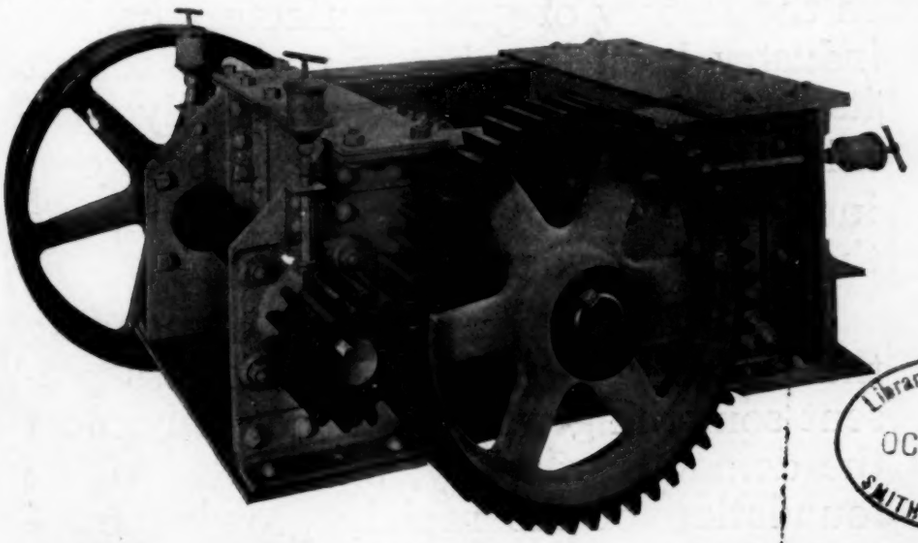

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Now more than ever before, specialized engineering knowledge and experience are demanded of designers and builders of gas plants. At no other time in the history of gas manufacture has the industry been in a better position to put its business on a firm, economically operating basis, and events of the past year indicate that the gas manufacturer is thoroughly alive to his opportunity.

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Designers and Builders of
By-Product Coke & Gas Ovens
PITTSBURGH, PA.

AMERICAN GAS JOURNAL. Oct. 26, 1922. Vol. 117, No. 20. Published weekly by American Gas Light Journal, Inc., New York, N. Y. Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

Daily Edition

AMERICAN GAS JOURNAL

Vol. 117, No. 20 NEW YORK—OCTOBER 26, 1922—ATLANTIC CITY Whole No. 3375

CONVENTION REACHES CLIMAX WITH ANNUAL BANQUET TONIGHT

Vice-President Coolidge to Be Principal Speaker At Dinner—Gasmen Elated at Success of Gathering.

The climax of the fourth annual convention and exhibition of the American Gas Association will be reached today, when every minute will be taken up with the big problems of the industry, culminating tonight with the annual banquet, which will be honored by the presence of Vice-President Calvin D. Coolidge, as the principal speaker. The closing of the convention is scheduled for tomorrow morning, and by early afternoon most of the members will have started for their homes, crammed full of new ideas, and satisfied that the Atlantic City gathering established a pace that succeeding conventions of the Association will have no small task to equal.

Gas problems of wide and divergent natures were discussed at the several meetings held yesterday, with attendance at the different sectional sessions that was more than gratifying. Many of the papers and addresses which featured the several sessions were of widespread interest and of the utmost importance to the industry.

This was especially true of the general session held in the morning, which was featured primarily by a most interesting report of the Commission on Resuscitation from Carbon Monoxide Asphyxiation, which opened a new avenue of thought for the Association members, and demonstrated to them the progress that has been made in the saving of human life. Another feature of the general session was an address by a Philadelphia newspaper man, J. S. S. Richardson, city editor of the Public Ledger, who spoke on "Public Relations," a subject which had a marked effect upon many of those who heard it. The several sectional sessions brought out volums of information and datta, and discussion was lively and interesting.

During the early afternoon hours the ladies in attendance at the annual convention were royally entertained at the Seaview Golf Club, with a luncheon and card party. There was no set program for last evening, the members and their guests being at liberty to spend their time according to their own selection. As was the case on Tuesday, there were dozens of little private dinner parties, informal conferences, and a spirit of good fellowship in evidence on all sides.

Every indication points to today being productive of much in the way of enlightenment for visiting gasmen. There will be the customary general session at Convention Hall in the morning, and the Technical, Commercial and Publicity and Advertising, and the Accounting sections will hold their usual afternoon meetings.

In addition, today's program will be featured by an open forum, under the auspices of the State Committee on Public Utility Information. This conference is scheduled for Room 17, Hotel Chalfonte, commencing at 2.30 o'clock, and promises to be liberally attended. The program for this forum will include a

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Consolidated Gas One of Few to Gain

General Tendency of Public Utility Issues Is Downward, with Closing Prices at Low Level

(By Staff Correspondent)

New York, Oct. 25.—Public utility stocks and bonds today participated in the general tendencies of the market, which in the main were downward. Consolidated Gas was one of the six or eight most active stocks of the day, closing at 142 5-8, an advance of 1 3-8. The action of this stock was noticeable because a majority of the active issues on the Wall Street market today closed lower, for example, Brooklyn Union Gas which lost a full point to 120. The bond market was unsettled, the readjustment in the relative value of Liberty Bonds having an unsettling influence generally.

The upturn in commodity prices, too, has a tendency to depress bonds, and the quotations, in the opinion of the best informed houses, are likely to be shaded rather than otherwise on the next transactions to be noted.

Public Likes Gas Heated Water More and More Says Simler

Hoffman Plant Running Full Capacity Now, Planning to Increase Size to Care for Demand

"I'm too busy telling visitors about our heaters to be interviewed right now," said O. P. Simler, general sales manager of the Hoffman Heater Company.

"Tell me about them,' 'said the reporter. "I'm interested, too."

"Well," said Mr. Simler, "this convention has been such a howling success and there have been so many visitors in our exhibit that I'm about talked out, but the gas heater subject is so near my heart that no matter how tired I am I can enthuse whenever some one says, 'let me look them over.'

"We are running one hundred per cent capacity right now and the orders are piling up on us so that it is necessary for us to increase our capacity. We've done more business in 1922 than in any of our 17 years of existence. This is due to the fact, I think, that our heaters are not assembled from parts bought from other plants. We make everything that goes into our product

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Post Would Standardize Retail Prices of Appliances

If Gas Companies Are Allowed a Discount from the Consumers' Price They Will Not Sell Below Cost—Sees Splendid Future

"Why did you ask me to talk about PRICE MAKING? It is the one subject upon which I prefer to be silent," said A. P. Post of the American Gas Co., of Philadelphia, yesterday. "But Mr. Post," said the reporter, "you know the subject from A to Z, you are one of the few who have given it enough thought to discuss it intelligently and fairly, and besides, it is of paramount interest to every man attending this convention."

"Alright," said Mr. Post, "if I can focus the X-ray of fact on a sore spot of the industry and thereby help the doctors effect a cure, perhaps it might be worth-while, after all.

"We are now suffering because in the beginning we did not realize the truth of the saying, 'As the twig is bent, so will the tree incline.' We started out to sell gas appliances below actual cost, our object being to increase the consumption of gas. This we did and our business grew and grew. While we lost money on ranges and heaters, we made it on the gas and so we patted ourselves on the back and thought we were good business men. Then the war came. Prices of appliances went sky high, our raw materials, labor and everything connected with the industry also acted like a sky-rocket and we found ourselves in a critical condition. We suddenly woke up to the truth, we were not getting enough for our gas to run our plants at a profit, and our losses on appliances made the situation still worse. We appealed to the Public Service Commissions, but they had case after case piled up on them and action was very slow. In the meantime we suffered as long as we could and then a great many gas companies, not being able to stand the millstone any longer, stopped selling gas appliances altogether.

"This left the manufacturer high and dry. He had plants and expenses and pay rolls and few orders, so he began to develop a new field. Department stores and hardware stores and plumbers could sell ranges and if the gas company didn't want his line, the other fellow did. We might aptly name that period 'The Birth of Competition.' As the baby grew it began to develop a vocabulary, and by the time the gas companies decided to again sell appliances, it had learned to take care of itself.

"The merchant fixed his price and he sold his stock of applinances at a profit. If his price was high, he said to the customer, 'Of course the local gas company is underselling me, they are selling ranges for less than cost in order to run me out of business. They make a tremendous profit on the gas and as soon as they break me, they are going to raise the prices on appliances.' If the gas company's price was higher than the dealer's he would argue thus: 'Certainly the gas company charges you more for a range or heater, did you ever hear of them giving anything away? They hold you up on every thing else and they are running true to form on their appliances.' There you are, we were getting it going and coming. And it isn't over yet.

"But there is a remedy. The companies who sell electric appliances have found it and we must follow their excellent example. The manufacturer of standard, electric appliances advertises his product and states the price at which it can be bought. He demonstrates its value to the housewife and no matter where she buys it the price is the same.

"There is your answer. The Gas Companies which sell appliances are really manufacturer's agents, we are the middlemen, the go-betweens, the deliverers of his merchandise. The delivery of his product to us does not constitute a sale, the sale does not really come into actual being until we place that appliance in the

(*Continued on page* 451)

H. L. DOHERTY

Coke Oven Progress Amazing, Says Ramsburg

Industry Has Made Giant Strides in Past Few Years and Has Become Vital Factor from New Angle

"Industries, like individuals, must either go forward or backward, there is no such thing as standing still," says C. J. Ramsburg, of Pittsburg.

"Probably no section of the gas industry has made more rapid strides in the last few years than that recorded in the manufacture and use of By-Product Coke Ovens. Always a factor in the gas business, because they have been the source of gas purchased from steel companies or merchant blast furnace operation, they are now becoming a factor in a very different way.

"It is no longer necessary to build large coke ovens to effect economy. Ovens are now being built having a capacity of five tons and capable of turning out 135,000 cubic feet per oven, per day, when operated with producer gas, ten of such units giving nearly one and one-half million cubic feet per day. The same ovens can be operated with good results down to five hundred thousand per day. These plants will operate without repairs for at least fifteen years, they are built to do so.

"Liquid purification has proved a wonderful success. Eleven plants are now being built and others have been planned. The gas business is the most important field for this process, but steel units, glass factories and many other businesses are vitally interested. A plant is now in course of construction near London and the industry is awaiting anxiously to hear how our English cousins like the process. Liquid purification has arrived. Gas engineers all over the country admit that in addition to its aid in distribution, it is a money saver as well.

"This has been a wonderful convention. I have enjoyed the sessions and the social activities. All of us will go home better prepared to tackle our every day problems as a result of having heard and seen all that is new and worth while in the industry."

When H. B. Montgomery, of the Traymore Hotel staff, went down on the Steel Pier yesterday he was regarded as somewhat unique—a buyer among sellers. It is not known what if anything Mr. Montgomery bought, but he got an eye-full of more than one exhibit.

Distribution Systems Occupy 2d Session of Technical Men

H. L. Doherty and Others Contribute to Important Discussion of Problems of All Companies

The second meeting of the Technical Section was called to order by the retiring chairman, C. N. Chubb, yesterday afternoon in Convention Hall, Steel Pier. Mr. Chubb announced that the report of of the Consumers' Meter Committee will be read at today's meeting.

The chair was then taken by R. C. Cornish, chairman of the Committee on Distribution Design. Mr. Cornish said in his report that both the low pressure and high pressure distribution systems have their own peculiar conditions and no hard and fast rules can be laid down for the individual to follow in selecting one or the other. He claimed that the problem was one for the consulting engineer and not for a committee. He remarked that a series of tests of service regulators was made by the committee, but that the results obtained were so widely different that the committee felt that this matrial should be retained for further investigation with the view to standardization of regulation by requiring them to be built according to certain specifioations.

R. G. Griswold then read an additional discussion of his paper, which is found on page 460 of this issue. Mr. Griswold had a number of interesting charts to explain the various points brought out in his talk. He emphasized that it is not necessary for the ideal distribution system to be designed with 2-inch pipe, but that the system calls for the smallest size of main to be cheap per foot.

DISCUSSION OF GRISWOLD PAPER

After Mr. Griswold had finished his exposition of the high spots in his original paper, the chairman called for discussion. The discussion was started by J. D. Shattuck, of Chester, Pa., who made a few remarks concerning his own personal experience in the design and operation of distribution systems. A. S. Butterworth, of the Illinois Public Service Commission, then gave a lengthy discussion of the paper. He commended the paper as a step in the right direction in the solution of the p roblem of distribution system design. "The problem is to supply gas to the consumer at the most economical cost," he stated, "which is one that should be tackled as the electrical engineer tackles his problem of the distribution of elcetrical energy. He advocated the plan of having more than one gas distribution system in the place of merely one, so as properly to take care of the various demands of the consumers to whom the gas is sold.

The discussion was continued by A. C. Forstall, of New York City, who had interesting data to give on the size of mains and feeders in distribution systems. He did not agree with Mr. Griswold's statement that the leakage of gas in distribution systems of small pipe was less than in distribution systems of large pipe. He said that the leakage of gas had nothing to do with the size of the pipe in the distribution system, but that it depended primarily on the number of meters per mile of main.

The meeting was addressed by J. D. Van Maur, of St. Louis, Mo., who read a paper in which he described the experience gained in the city of St. Louis with various sorts of distribution systems, various kinds of piping used, etc. The discussion was then continued by H. E. Bates, of Chicago, Ill., and Geo. Wehrle, of Denver, Col.

DOHERTY CONTRIBUTES TO DISCUSSION

A paper, prepared by H. L. Doherty, of New York City, copies of which had previously been distributed among the members was read. Due to a cold, Mr. Doherty was unable to read his paper, which was presented instead by Mr. Griswold. In his short introductory talk before the reading of the paper and in the paper itself, Mr. Doherty brought out the fact that the distribution system which Mr. Griswold described in his paper and which was being discussed by the members had been in actual operation in various places for a period of over twenty years with good results and that the objections which had been mentioned in the course of the meeting had not been encountered during that period of actual operation.

In his paper Mr. Doherty reviewed some of his work done in connection with the problem of gas distribution, extending over a period of many years. Because of his early association with the electrical industry and the experience he had gained with distribution system design and operation therein, Mr. Doherty stated that he believed that considerable assistance could be gained from a study of the methods used in solving distribution problems in the electrical industry, even though these problems are

(*Continued on page* 451)

Southern Gas Men To Convene In Florida

Select St. Petersburg as Scene for 1923 Gathering—Chair of Gas Engineering Certain at Johns Hopkins University, Members Are Told.

St. Petersburg, Fla., was selected as the site of the next convention of the Southern Gas Association, on April 16th, 17th and 18th, next, at a meeting of the Board of Directors of the organization, held yesterday at the Hotel Traymore. P. H. Gadsden, president of the Association and chairman of the Board of Directors, announced that excellent progress has been made for the establishment of a chair of gas engineering at Johns Hopkins' University in Baltimore, Md. Fifty per cent. of the maintenance funds have already been subscribed by the Association members, and indications are that the rest will be forthcoming before the 1923 convention is held.

Vice-President Edward L. Rieha, of Baltimore, told of a trip to Havana, which will be held apart from the convention, for members in attendance at the conclave. All details for a two-day jaunt to Cuba have been arranged, he said, and the delegation will be the guests of the local gas company, which has prepared an extensive program of entertainment.

L. I. Pollitt, of Baltimore, was chosen to head a committee which will supervise the raising and disbursement of funds for the Johns' Hopkins University chair. Manufacturers of apparatus and appliance have manifested much interest in the project, and have furnished a goodly part of the equipment for the instruction.

In discussing the forthcoming convention, President Gadsden stressed the importance of emphasizing the economical and industrial phases more so than the technical side of the gas industry. He said that by so doing the public would be better informed as to the vital importance to them of the gas industry, and thus better public sentiment would be created.

It was decided to form committees in each state, made up from three to five persons each, to further the interests of the industry by publicity methods. These committees will function in state capitals or wherever meetings of regulatory commissions are held.

Those who attended the Board meeting were P. H. Gadsden, Edward L. Rieha, George Bean, John Golden, John Conlin, S. E. Lyton, George H. Smith, H. J. Hole, R. J. Rawson and A. B. Shelding.

B. Ryan and E. W. Pratt are in charge of the B. Ryan Company, New York, booth, of which "Thermoflash" is a feature.

PICKED IN PASSING

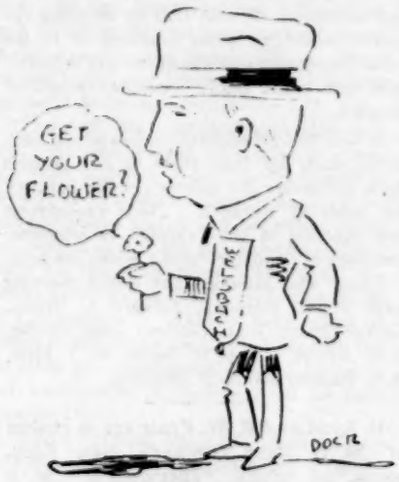
"Go over to the Strause exhibit and get a light" is the universal answer when ever the frequent appeal is made for a light for one of the convention cigars, and sure enough there the seeker finds something that has been serving the part of a cigar lighter for the entire convention hall. It is one of the new type stove lighters, manufactured by the Strause Gas Iron Company, of Philadelphia, which emits a thin flame approximately two feet in length.

"That little thing is making our booth one of the most populated in the hall," said Mr. Strause, president of the company.

F. N. Smith, pattern superintendent, and M. N. Davis, southern representative of the Dresser Manufacturing Company, of Bradford, Pa., are in evidence bustling about the exhibition as well as in their display, with an activity that indicates a good rush of business, to the home office. When they are a little less busy we hope to interview them.

M. Shiebler, consulting engineer with office in New York, and Harry E. McGowan, of the Brooklyn Union Gas Company, were among the earliest arrivals at the Steel Pier yesterday morning, arriving before the "purification squad" had finished their broom work. Mr. Shiebler found the American Gas Journal's registration list "100 per cent. correct."

Members of the Commercial and Publicity Sections are patting each other on the back because of the enthusiasm and attendance at their meeting in the Vernon Room at Haddon Hall Tuesday after.



C. W. WARDELL

ncon. More than 600 delegates were present, according to one man's count. While, to quote Mrs. Malaprop, "comparisons are odorous," one publicity man pointed out that whole conventions had been held in the Vernon Room, which was crowded by just one section of the American Gas Association.

Those two oriental dancers doing an obeisance while they offer Milwaukee Gas Specialty Company devices on a board held between them are oft noted. O. J. Leins and Ira C. Misner, in charge of the booth, remark enigmatically that there are "symbolism," and "expressionism" back of the statuettes.

F. A. LEMKE

Interest of the gas industry in "mechanical accounting" is increasing rapidly, according to C. E. Burns, assistant manager of the Remington Typewriter Company.

"During the last ninety days particularly," Mr. Burns stated yesterday, "the gas industry has shown a growing appreciation of the advantages of accounting with the aid of modern office equipment. This growth is continuing and is manifesting itself in increased orders for this equipment."

Associated with Mr. Burns at the Remington booth on the Steel Pier are J. E. McKerracher and J. T. Laden of the Remington offices in New York, and C. M. Hilsee, of the Philadelphia office.

Robert K. Clark, of George M. Clark & Co., is expected to arrive at the convention today.

F. C. CURFMAN

One of the most optimistic men at the convention is Stanley Grady, secretary of the Roberts & Mander Stove Co., Philadelphia, who reports that business is excellent.

"We are booked ahead on production for a considerable period and there is every evidence in both inquiries and orders that demand for our products will more than hold its ground—that it will increase," Mr. Grady said.

The "Quality" stove exhibited in the Roberts & Mander booth has attracted much attention. It is set in a frame and is a picture in more sense than one. "Quality" heaters also are shown in the booth.

With Mr. Grady are Harry P. Dains, R. L. Morse, T. J. Warren, K. C. Farnsworth, C. L. Lyon, and L. B. Williams.

The response of D. M. Hamilton, general manager and treasurer of Acme Brass Works, Detroit, to the inquiry, "How's business?" is rather convincing.

"We are less than four years old and have increased our floor space, under cover, from 7,500 feet to 28,000 feet—and we have some vacant space on which we can build further," he said. "We have recently made an addition to our plant.

"Yes, business is good and looks as if it were going to be better."

Mr. Hamilton is accompanied by Mrs. Hamilton and Master Henry Hamilton, and by Charles Waterman, of the Acme Brass Works staff. Mr. Waterman, like Mr. Hamilton, makes his headquarters at Detroit.

At the booth of Kennedy—Toombs, Inc., are President W. Kennedy, General Manager F. P. Toombs, Vice-President Hoyt Kaley, and Sales Manager L. L. Campbell.

F. H. KNAPP

Gas and Football Are Popular In Iowa

C. N. Chubb Declares Business Conditions in Western States Are Good — Tells of Experiments

"Iowa is much on the map these days, both in football, having beaten Yale, and in gas development," affirmed C. N. Chubb, retiring Chairman of the Technical Section and President of the Iowa Section of the N. E. A. L. for the coming year. "Business is progressing well in Iowa, where the agricultural conditions are excellent, which means that times are good in all lines of business."

Mr. Chubb is a graduate Civil Engineer of the class of 1901, Massachusetts Institute of Technology. With the exception of two years' initial work in the railroad field, Mr. Chubb's whole life has been spent in the gas industry. He has been managing properties since 1905 in five different locations in all. At the present time Mr. Chubb is the Vice-President and General Manager of the Peoples' Light Company of Davenport, Iowa. He also holds the position of gas engineer of the United Light and Railway Co.

Mr. Chubb told the representative of the American Gas Journal of some interesting and important experiments that were conducted at the Davenport gas plant on the use of coke and bituminous coal as generator fuel. These experiments were directed by W. W. O'Dell, of the Bureau of Mines, in conjunction with the Geodetic Survey of Iowa. A detailed report of the experiments will be published in pamphlet form by the Bureau of Mines.

In conjunction with the Engineering Extension Department of the Iowa State College, Ames, Iowa, experiments are being conducted at Fairfield, Iowa, on the steaming of stop-end horizontal retorts. An interesting and valuable report of the results of the experimentation is expected to be published shortly. Mr. Chubb also told the reporter of the important work being done by the Iowa Section in giving gas meter men a short course in gas technology. The Iowa Section was the first to undertake this work.

Beg Pardon

Bill Dunker lost his membership in the A. G. A. yesterday. He got it back today, the Registration Department simply made a mistake.

A. BRILL

A complete sales organization is presented at the George D. Roper Corporation booth. Included in the party are: George D. Roper, Mabon P. Roper, W. E. Derwent, J. F. Parker, W. L. Powers, H. C. Kline, H. C. Aiken, T. E. Rooke, C. J. Breen, W. C. Quinn, C. C. Babcock, J. H. Fagan and H. F. Andrews.

Official stenographic reporting of the convention is being done by T. E. Crossman, on general sessions and technical section; Percy Lowe, accounting section, and M. C. Kestenbaum, commercial and publicity section. It is Mr. Lowe's lifelong regret that the delegates have not his voice, which is deep and loud enough to be heard anywhere within 200 yards.

Standardize Names of Committees Says Fogg

This Will Avoid Confusion and Will Aid in Simplifying Work in Future, Says A. G. A. Secretary

An informal luncheon was given to the secretaries of the affiliated associations, the secretaries of the sections of the American Gas Association, and the newly elected chairmen of the sections of the American Gas Association by Col. Oscar H. Fogg, at the Hotel Traymore yesterday. The object of the affair was to enable the various secretaries who had been in correspondence with each other for some time but had never met face to face, to become personally acquainted, and to introduce the incoming chairmen of the various sections. Owing to the informal nature of the affair, speeches and addresses were eliminated and the time devoted entirely to general sociability.

A suggestion for the standardization of the names of committees doing the same work was made by Col. Fogg who called attention to the fact that there were several committees with various titles, all of which were devoted to rate standardization, but that because of the difference in titles, confusion frequently resulted. He suggested that in future the title of committees doing the same work be made uniform.

Members of the accounting section are making one boast that they have the best and most courteous presiding officer in the convention. This is Ewald Haase, of Milwaukee. Mr. Haase is on his feet most of the time—a very deferential dictator, so to say: he rules with dignity but with amenities which have won the admiration of all who have been under his mild sway.

N. GOREAU

Feminine Contingent Entertained at Seaview

Luncheon and Card Party Tendered Ladies of the Convention at Beautiful Country Club

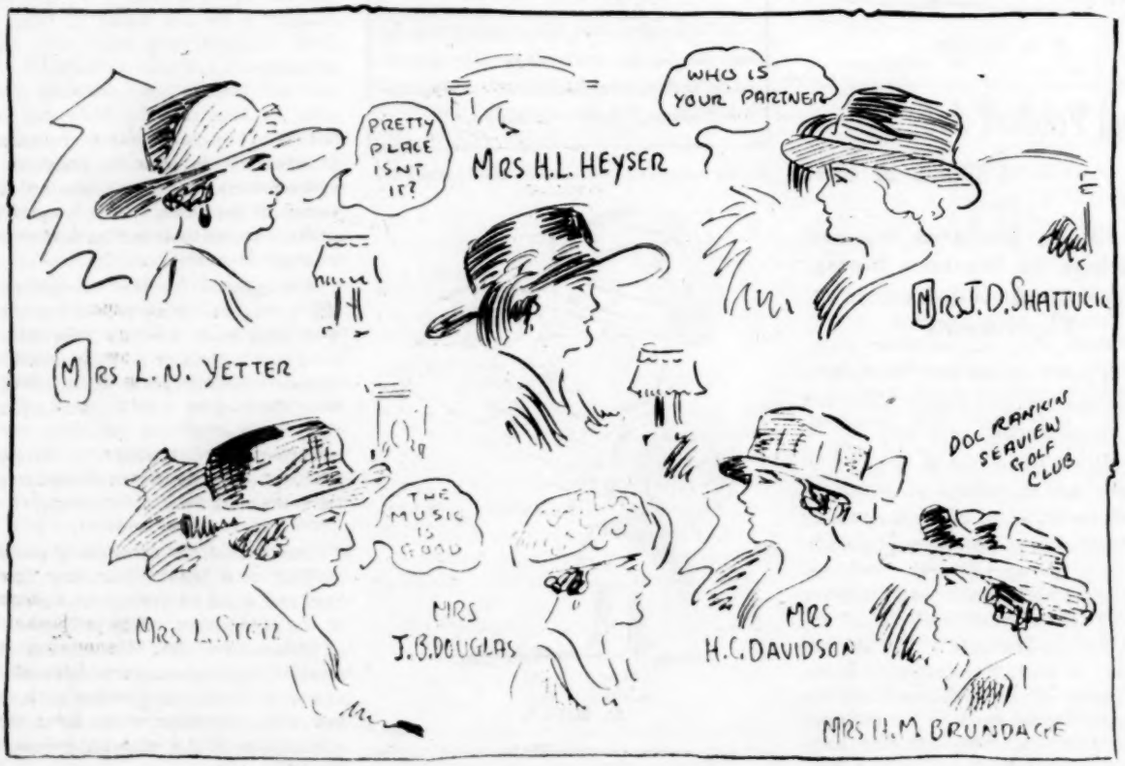
The beautiful club building of the Seaview Golf Club was filled almost to overflowing yesterday afternoon by feminine representatives of the convention, who were guests of the Association at a luncheon and card party at the country club. Shortly before 12 o'clock a stream of automobiles wended its way along the eight-mile drive, many of their occupants receiving their first glimpse of Atlantic City and the surrounding country. Arrived at the club, after a brief look at the panarama in whose honor the club is named, and which includes the golf links, tiny hills, and the ocean inlet, guests hastened inside to their places at luncheon.

Covers were laid for more than 325 persons, all of whom were comfortably placed at numerous tables in the long, cretonne-decorated sun parlor, made doubly bright by palms, ferns and flowers. While the luncheon progressed a five-piece orchestra played softly. At its conclusion the house emptied, everyone going outside to be included in group pictures.

Bridge lovers then collected at card tables and were informed that a first and second prize would be awarded in each group. Those capturing first honors after the afternoon's play included Mrs. George E. Roper, Rockford, Ill.; Mrs. R. F. Kelly, Montclair, N. J.; Mrs. W. A. Carroll, New Bedford, Mass.; Mrs. C. S. Paige, Worcester, Mass.; Miss Gene Seel, Charleston, S. C.

Much credit for the success of the affair is due Mrs. E. L. Heyser, Philadelphia; Mrs. L. N. Yetter, Atlantic City; Mrs. J. D. Shattuck, Chester, Pa.; C. Geist, Atlantic City; J. B. Douglas, Philadelphia; J. B. Meyers, Philadelphia; J. Rolston, Philadelphia; Louis Stotz, A. T. Bell, Atlantic City.

Among those at the luncheon were Mrs. George R. Althen, Mrs. E. G. Jackman, Mrs. D. W. Chapman, Mrs. P. D. Warren, Mrs. H. S. Anderson, Mrs. D. S. Hudson, Mrs. H. Russell, Mrs. D. W. Clinton, Mrs. C. A. Luther, Mrs. G. E. McKana, Mrs. P. E. Welton, Mrs. W. A. Devine, Mrs. William Gould, Mrs. C. F. Armdorf, Mrs. R. Muloch, Mrs. W. G. Africa, Mrs. Stanley Grady, Mrs. J. B. Slattery, Mrs. C. Fairfield, Mrs. R. G. Regester, Mrs. A. P. Conroy, Mrs. Joseph Sands, Mrs. H. E. Almberg, Mrs. L. E. Morier, Mrs. George H. Joy, Mrs. J. B. Jones, Mrs. B. B. Ferguson, Mrs. W. F. Reid, Mrs. V. A. Morhaus, Mrs. A. S. Hall, Mrs. T. J. Lucas, Mrs. W. R. Morris, Mrs. J. H. Taussig, Mrs. W. R. Wolfinger, Mrs. H. H. Clark, Mrs. M. S. Sherwood, Mrs. R. H. Patterson, Mrs. W. A. Castor, Mrs. J. M. Coles and Miss Ester Coles.



Right across from the Bureau of Mines booth where those two famous figures in the history of heroic rescue work, Yonk and Jury, have their abiding place during the convention, is B. Ryan, of the B. Ryan Company. Yestreday A. A. Munsch, in charge of the Bureau of Mines booth, was speaking of "Yonk" to a visitor, when Mr. Ryan interrupted.

"Did you speak to me?" called Mr. Ryan. When he was directed to "Yonk," he said that was his nickname and pulled from his pocket a letter from his nephew in Canada, addressed, "Dear Yonk."

"And I thought I was the only person in the world called 'Yonk,'" sighed Mr. Ryan. "There simply is nothing new under the sun."

"Tycos" weather bureau said last night:

"Clearing, slight squalls. Fair and cooler tomorrow."

At 9.30 o'clock last night the barometer had fallen to 29.6—probably taking those squalls into account.

Gasmen Warned Against "Nothing to Say" Attitude

J. S. S. Richardson, Philadelphia Newspaper Man, Addresses General Session on "Public Relations" and Points Out Unwiseness of Big Men of Industry Refusing to Talk on Matters That Interest the Community

The gas men who, when questioned concerning information that is of public importance, answers "Nothing to say," is not helping to bring about the more cordial relations that is constantly being sought with the outside world by members of the industry, was the opinion expressed at yesterday's general session of the convention by J. S. S. Richardson, city editor of the Philadelphia Public Ledger, who spoke on the theme, "Public Relations." Mr. Richardson said that his interpretation of applied public relations in business is the humanization of that contact which is essential between business and an enlightened public. The address was presented before the general session for the Publicity and Advertising Section, and was the topic of much favorable comment at its conclusion. Mr. Richardson said in part:

"The gas man in a convention frame of mind, mingling, as he is here, among his fellow craftsmen, may be an entirely different individual at his own desk in the environment of his own local surroundings, influenced, and perhaps cramped by the divergent strain and pressure of business exigency. It is that strain and that pressure which gives to many an otherwise human and soulful individual the austere aspect of what we may have come to regard as the hard-boiled business executive who declines to inform himself upon seemingly unimportant matters which really are vital and essential to the healthy functioning of big business concerns and especially public utilities.

"Personally, I hold a very high opinion of the gas business and of gas company executives, but it is an opinion that is susceptible of market improvement and I shall endeavor to show you why. My contact with the gas business has been across the editorial desk of newspapers in recent years and before that, as a reporter working on assignments, many of them having to do with the great business in which you gentlemen are engaged. During these years I have had occasion to move about the country so that my observations have not been restricted to one locality or to one organization.

HAVE "NOTHING TO SAY"

In company with other reporters I have called at the executive offices of gas companies for information which, from the viewpoint of the public and also from the viewpoint of the public utility concerned, was of great importance. All too frequently we received the old reply, 'Nothing to say,' when that reply meant a pronounced and serious setback to public relationship with the company. Gentlemen, if you value the friendship of the public, which I am certain you do, guard against that statement, 'Nothing to say.'

"For a great many years men high in the affairs of the nation and men foremost in public life have realized the futility of that remark. When representatives of responsible newspapers have gone to them to seek information concerning matters of grave portent and interest to the public and it was not expedient at the moment to make public the facts, the reporters have been taken into the confidence of those men and have been given a complete explanation of the vexing elements in the situation and informed that the facts, as related were imparted in confidence, I have never known an instance of the violation of such a confidence. Questions of international gravity have been discussed frankly and freely in the course of such confidential conferences and nothing whatever has been published until official release was authorized.

"I have used the expression 'responsible newspaper representatives,' for we all know, without going into details who are the representatives of the irresponsible publications. One has but to glance at the news and editorial columns of the fortunately rare examples of jaundiced journalism to determine the measure of trust to repose in their flambuoyant and fanciful seekers after the alleged truth.

HOW IT HITS THE PUBLIC

"When the man in the street reads the laconic 'Nothing to say' after your name in connection with a matter concerning which he knows you have much to say if you would, his very natural conclusion is that you had lots to say but for some reason which he will grossly misinterpret, you did not dare say it. Gentlemen, as guardians of a great public service it is your bounden duty to acquaint the public with facts which they should know. If it is not expedient at the moment so to acquaint them, tell the reporters o fthe leading daily newspapers why. Tell them in confiedence why and they will respect that confidence. If possible have someone in your employ who knows how to do it, but don't call him a press agent. He will lose cast at once with the reportorial clan.

"You do not have to become loquatious with the press, but avoid the 'nothing to say' remark. Politicians are thoroughly conversant with the art and craft of public relationship. Charles F. Murphy, Tammany's perpetual pontif, has perhaps said less for publication than any other living politician, yet he has always been shrewd enough to guard against the 'nothing to say' pitfall.

"Many times big business men and politicians have learned by costly experi-

(*Continued on page 450*)

New England Companies Progressing, Says Dr. Wing

Dr. J. F. Wing, Chief Chemist of the Boston Consolidated Gas Co. and Chairman of the Chemical Committee of the Technical Section of the American Gas Association, had some interesting remarks to make regarding the good work being done by the various New England gas companies in operating their gas plants more intensively so as to increase the output of gas from the existing apparatus. Automatic control of water gas machines and the use of scrubber-washers are two outstanding features of this development.

F. H. BEEBE

The Eternal Feminine by Betty Bennett

AND STILL THE WOMEN REGISTER

"Name? Two 'nns'? Address? Is that New Jersey? Staying where? No, I mean in Atlantic City. You get those down at the end. Next!" Still registration continues; and they say that a last minute avalanche of women registrants has descended upon the registration bureau.

Among the more recent registrants are Mrs. C. E. Paige, Worchester, Mass.; Mrs. R. Polk, Philadelphia, Pa.; Miss K. Potterger, Philadelphia, Pa.; Mrs. J. F. Ranier, Memphis, Tenn.; Mrs. J. M. Roberts, Chicago, Ill.; Mrs. George Roper, Rockford, Ill.; Mrs. W. P. Schwak, Thompsonville, Conn.; Mrs. H. Smith, Quincy, Mass.; Mrs. J. M. Spitzglass, Chicago, Ill.

Let's have a new paragraph! Others included were Mrs. A. L. Tassell, Chicago, Ill.; Mrs. Ellen Taussig, Philadelphia, Pa.; Mrs. G. W. Travis, New York City; Mrs. G. Vincent, New York City; Mrs. C. W. Wardell, Gloucester, N. J.; Mrs. P. E. Welton, Detroit, Mich.; Mrs. J. Willig, Atlantic City; Mrs. F. A. Witman, Berwick, Pa.; Mrs. W. Wurth, Chicago, Ill.

VIVACIOUS PIE

Most persons must have known just how interesting it would be to watch a pie being made, judging from the baker dozens, men included, who were turned away from the packed auditorium yesterday morning. The occasion was a cooking demonstration by Mrs. Anna J. Peterson. Before she had talked five minutes everyone in the big room was grinning, eagerly waiting her next words.

"The lesson this morning is pie making," she began. "I believe that there is nothing more fascinating than pie. You know the kinds of persons who are most interesting, don't you? The vivacious. Well, that's the kind of pie I like. Vivacious pie. The kind that melts in your mouth. Pie you don't have to chew. Pie you don't get tired cutting.

"To make a vivacious pie you must have 1¼ level cups of sifted-once flour. Then you want ¾ teaspoonful of salt and ½ level, not the guessing kind, teaspoonful of baking powder. The latter is optional. To make your pie light and more digestible is the reason for using it. Good reason, isn't it?

"Next in line is 1-3 cup of melted shortening. If you measure it in solid form you don't know how much water there may be along with the fat. And the joy of being careful is t oknow that you'll have good pie! Add ¼ cup of water to the melted shortening, stirring them together.

"Now to your sifted dry ingredients add the liquid. Some persons prefer a knife, some a spoon. One is as good as another. Next put the mixture on the board and then roll all you like. Just don't lie down on it!

Mrs. Peterson then held up the rolled pastry carefully placed over an upside down pie tin. Half the audience craned their necks to get a good view.

"Don't pull the crust into shape over the tin," she continued, "for doing so lets the juice run out when the pie expands in the hot oven."

Gingerly she carried the crust to the oven, "Place the pie crust in the center of the oven. On the bottom it could get the intense heat, not the circulating heat that makes the finest pies."

A bowl heaped with apples next came into the limelight. "I never pare apples," she declared. "You're just wasting them and time. Besides you lose the best flavor. Just wash them well, core, and cut into smaller pieces.

"If you are home, it's a good plan to have apple fritters, especially if it is the last of the month with your budget money looking very small and your husband calls you, saying, 'Dear, I'm bringing home two guests tonight.' The 'dear' doesn't sound very clever coming like that, does it?

"I sift sugar, spice, and salt together and then stir well in order that each piece gives off juice at the same time. The amount of sugar is governed by the

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Today's Schedule for the Ladies

Cooking demonstration at 10.00 by Mrs. Anna J. Peterson, followed by awarding of range to holder of lucky number. Held in the Auditorium, second floor, Steel Pier.

Afternoon open.

Annual banquet in the American dining room of the Hotel Traymore at 7.30, evening dress optional. Dancing afterwards.

THE ETERNAL FEMINETTE

PLAY IN ONE ACT

CHARACTERS

Madge—Motherly young matron.
Charles—Tired business man.
Lottie—Fifty pounds of childhood, age four.

SCENES

I. Approach to the exhibition pier.
II. Arrival at the pier.
III. Departure.

SCENE I.

Charles—"We'll want to take a look at the minature house in front of the exhibition building. They say it's complete with gas lights, radiators, stoves, everything."

Madge—"Yes, we mustn't miss seeing it."

Dottie—"Muvver, p'ease don't stop. Let's go right in to the 'bition."

SCENE II.

Charles—"Look at that! Great Scott! Imagine the work to make a little house like that so complete."

Madge—"Oh, how lovely! And do you see those pretty flower boxes?"

Dottie—Silence.

SCENE III.

Charles—"Ready to go, Madge? I sort of want to see those new gas pumps this afternoon."

Madge—"All right. I want to find that booth where they are giving free chances on a stove. Come on, Dottie."

Dottie—"Lookee, the pretty light."

Madge—"Come, come, Dottie. We can't stay here all afternoon."

Dottie—"Lookee, the pretty fire p'ace."

Madge—"Come. Do you hear me?"

Dottie—"Lookee, the——."

! ! ** (') ? ? Wails, squalls, yells.

(Curtain)

Humphrey On the Tee

(With Due Credit to Casey)

There was ease in Humphrey's manner
As he stepped up to the tee.
There was pride in Humphrey's bearing
And his smile was one of glee.
The way he stood the kidding
As he gently wagged his club
Convinced the golfing gas men
That Humphrey was no dub.

The foursome's eyes were on him
As he rubbed his hands with dirt,
His two opponents guyed him
As he wiped them on his shirt.
If he was slightly nervous
It didn't show at all.
As gracefully he stooped and teed
The little rubber ball.

And then our hero swung his club,
And then he let it go.
And then the links was jolted
By the force of Humphrey's blow.
He looked to see that little ball
Go sailing through the air,
But strange to say, it hadn't moved.
Serene, it rested there.

Oh, somewhere in this favored land
The sun is shining bright,
The bands are playing somewhere,
And somewhere hearts are light.
And somewhere men are laughing,
And somewhere children thrive,
But there's no joy in Kalamazoo
Since Humphrey fanned his drive.

—SYD.

Must Co-operate With Plumbers, Wolley Says

Tells Commercial Session Importance of Bringing About Closer Relations—Introduces "Second Inning Stretch" for Conventions

One of the peppiest of the many excellent talks so far given before members of the Association was that yesterday afternoon of William J. Woolley, manager of the National Trade Extension Bureau, of Evansville., Ind., delivered before the joint session of the Commercial and Publicity and Advertising Sections. Mr. Woolley spoke on "Why Gas Companies and the Plumbing Trade Should Co-operate and How," and at the conclusion of his very masterful address received a round of applause which must have undoubtedly assured him of his success in driving home to his hearers his plea for moral support to his plan.

Mr. Woolley must be given credit for introducing "the second inning stretch" for conventions, evidently a deriviation from the historic last half of the seventh "stretch" in baseball. Following a somewhat lengthy discussion at the conclusion of an address on "Automatic Water Heating," by C. E. Bartlett, president and manager of Bartlett & Co., Inc., of Philadelphia, (in detail on Page 464), Mr. Woolley, before beginning his address called upon the several hundred members in the auditorium to rise and not only stretch their legs, but also their arms. Every man in the hall responded to the novel invitation, and then settled back for what proved to be a most illuminating talk.

The education of the public that plumbers are not thieves, as more than 99 per cent of their number are generally credited with being, through the medium of publicity and co-operation by gas men, was the plea set up by Mr. Woolley. He went into detail at length as to the need for perfect harmony and co-operation between plumber and gas man, and presented some very interesting statistics. By removing the widespread prejudice against the plumber, the Association members will help the dealer to sell more appliances and there will be beneficial results for all, Mr. Woolley contended.

Just prior to Mr. Woolley's address Association President Barnum, who was observed in the large audience as an interested listener, was called upon the rostrum and received a rousing ovation from the members. Mr. Barnum made a few brief remarks, in which he told of conditions and changes in the gas industry during the past twenty years, and made the prediction that within the next fifteen years there would be a complete reversion of the amount of gas sold on a wholesale rate t othe extent of 75 per cent, whereas the percentage now is about fifteen or twenty, as compared with eighty per cent now sold at retail rates.

"We have the largest retail credit business of the world," said Mr. Barnum, "and have possibilities that no other commercial proposition has." He was loudly applauded at the end of his talk.

Yesterday's program called for an address on "Salesmanship in Public Relations," by E. J. Cooney, sales and service manager of the Lowell Gas Light Co., of Lowell, Mass., but it was decided to postpone the feature until today's session. At the closing meeting this afternoon there will be an address on the "Relation of Home Cooking to Gas Sales," by Mrs. Anna J. Peterson, director of the Home Service Department of the Peoples' Gas Light and Coke Company of Chicago, which gives promise of being most entertaining. D. W. Chapman, of the same company, is scheduled to read a paper this afternoon on "The Two-fold Value of Efficient Application of Industrial Gas."

Question

When does a cartoonist become a magician?

ANSWER

When he changes O. P. Simler to O. P. Smith.

Best Convention Ever Says A. J. Gonnoud

"There is no doubt about this being the best convention the Ameri an Gas Association has ever had. The attendance has been larger and more interest has been shown in the exhibits and the meetings than ever before," said A. J. Gonnoud, of the Kings County Lighting Company.

"There's a reason for it, too. Business conditions throughout the country have shown a wonderful improvement, our troubles have been minimized and our minds are keener and more able t enjoy things. We are beginning to breath easy again and all of us welcome the relief from the terrible tension we have been laboring under."

"I have heard many favorable comments upon the papers and the talks of the accounting section. They were excellent and I'm going back home with several new ideas I got attending this meeting."

The Eternal Feminine

(*Continued from page* 444)

sourness or sweetness of the fruit. I'm taking a cup of sugar to mix with the apples."

She then looked at the audience smiling, "And the result will be a regular man-size pie, one that will start your husband telling you funny stories of what's been happening today."

Many at this point were forced to leave because of having made plans to attend the luncheon at the golf club, remarking to each other that they would certainly be back tomorrow.

ALMOST A LIFE AND DEATH MATTER

"That's just the size for an apartment house. The one near you has the long legs. I like the all white enamel. Don't you like all the compartments in that? Really, I can't decide. Hold my bundles while I sign up, will you please?"

Such is the conversation heard about the booth where free chances are being on a gas stove, model to be selected and then designated on the entering coupon. But how is one to know at a glance at a dozen or two most attractive models which one is most desirable, for after all, one might be the lucky winner. Someone has to be the winner, you know.

Among those who are having the fun of choosing a stove—shipped free to one's residence—which she may or may not receive are: Mrs. Charles I. Baker, Glenshaw, Pa.; Miss Irene McKenty, Hamilton, Ontario; Miss Gladys Stead, Philadelphia, Pa.; Mrs. Arthur Friedman, Cleveland, Ohio; Mrs. L. D. Jardby, Ventnor, N. J.; Miss Eleanor King, New York City; Mrs. H. R. Scrivener, Washington, D. C.; Mrs. C. A. Learned, Meriden, Conn.; Mrs. Jack E. Cusach, Atlantic City, N. J.; Miss Elois C. Titlow, Philadelphia, Pa.; Mrs. E. H. Patterson, Ventnor, N. J.; Mrs. W. O. Lavison, Jr., West Chester, Pa.; Mrs. W. R. Causbrook, Plainfield, N. J.; Mrs. C. E. Wetzel, Philadelphia, Pa.; Mrs. M. M. Messich, Atlantic City, N. J.

WHAT ONE WOMAN WRITES HOME TO HER NEXT DOOR NEIGHBOR

Wednesday.

Dear Nell:

Just came back from the luncheon at the golf club. I won a prize! A dandy enamel box of candy, rose colored—the box, not the candy, I mean. Don't you ever tell me again that I can't play bridge!

The golf club is about fifty miles out, at least it seemed that we drove that far,

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UN—CONVENTION—AL

JIM BROWN

P. F. McEnaney while strolling down the Boardwalk noticed a very attractive ladies' shop. He went in and told the blonde saleslady that he wanted to see some ladies' hose. "Do you want them for your wife," said the girl, "or would you rather see something more expensive?"

Bill Hutchinson, of the Sprague Meter Co., ran out of small bills Tuesday. He had plenty of fifties and hundreds, but no fives and tens. He saw a newsboy on the Boardwalk and asked him if there was a bank nearby. "Yes, sir," said the boy, "there's one here and I'll show you just where it is. He walked about two blocks with Bill and then pointed to the Boardwalk Bank. Bill thanked him and gave him a quarter. "That isn't enough," said the boy. "I like your nerve," said Bill, "how much do you think I ought to give you?" "Five dollars," answered the kid, "bank directors are very highly paid in Atlantic City."

John C. Clark arrived Monday and after registering asked the meal hours. The clerk answered, "breakfast from six to eleven, lunch from eleven to three, dinner from three until eight. "Say old man," said Clark, "can't you let me off a few hours for drinking?"

D. M. Hamilton, treasurer and general manager of the Acme Brass Works, of Detroit, Michigan, who is staying at the Traymore Hotel with Mrs. Hamilton and "Junior," age five years, is strongly in favor of the present form of exhibition and for Atlantic City for its location.

"For the man accompanied by his family Atlantic City offers far better and more healthful advantages than any of the large and crowded cities that could be selected. This convention has been eminently satisfactory to us in a business and social way, and also to most of those I have talked with."

"Loaded to the Gills—with business!" is the way C. I. Baker, sales engineer of the Rudd Manufacturing Company, of Pittsburgh, Pa., tersely put it when asked regarding business.

ED. FALVAY

BILL HUTCHINSON

R. H. BURDICK

Mr. Ruud, president of the company, is personally in attendance at the Ruud Company's elaborate display, which forms one of the finest and most handsome exhibits ever shown at any convention in the industry. Assisting are: Messrs. A. P. Brill, general manager; J. C. Dyer, Jacksonville, Fla., representative; E. C. Bartlett, Philadelphia representative, and Mr. Baker.

R. L. Kahle was a happy man—his quick meal stove models arrived and were put on exhibition. They appeared to be making up for time lost in transit.

COL. ROPER

Gas Men Evince Interest In Resuscitation Methods

General Sessions Learn of Rapid Advance Made to Save Lives of Hundreds Who Each Year Are Overcome by Carbon Monoxide Gas—Reports and Papers Submitted on Variety of Subjects

Subjects bearing importantly upon the gas industry were treated in comprehensive, skilfully rendered addresses and reports at the general session yesterday morning. Industrial phases discussed and reported upon ranged from problems of accountancy and publicity tomethods of accident prevention, and the fact that the session was profitable and entertaining to those present was evidenced by the rounds of applause accorded the speakers.

Impoved methods of resuscitation devised to save the lives of hundreds of persons who are overcome every year by carbon monoxide gas were concisely described by a commission of prominent physicians and scientists who were appointed to cope with the problem by the A. G. A. The report was renedered by Charles B. Scott, Bureau of Safety of the Association, Chicago; Dr. Yandell Henderson and Dr. Howard A. Haggard, of the Laboratory of Applied Physiology, Yale University.

A remarkable feature of the commission's work was that several of its members voluntarily entered gassing chambers where they inhaled the deadly carbon monoxide gas for the purpose of testing the new method. The experiments were conducted in co-operation with the U. S. Public Health Service, the U. S. Bureau of Mines, several universities and more than forty New York City hospitals. So successful were the experiments that experts have pronounced the recommendations made by the investigators as one of the greatest contributions to the problem of preventing gas poisoning.

Perhaps the most important discovery made by the commission, as outlined in the report, is that the inhalation of oxygen and five per cent. carbon dioxide, by causing a full ventilation of the lungs, rapidly eliminates carbon monoxide from the blood and thereby terminates the condition of asphysia.

"This treatment is highly effective, inducing rapid and complete recovery if applied early enough," the report stated. "It requires merely general medical supervision and it may be safely and efficiently carried out by intelligent men of the type composing the emergency crews of a city gas company.

"Manual artificial respiration by the prone pressure method should be employed when respiration has stopped, to start spontaneous breathing," the commission recommends. "This object may be assisted by administering oxygen and carbon dioxide simultaneously. Treatments extensively used for this type of gas poisoning, such as bleeding, transfusion, artificial respiration, and oxygen inhalation were carefully investigated.

"There is no adequate theoretical reason for bleeding, but rather to the contrary," the commission declares. "Bleeding is probably injurious by further depleting the oxygen transporting power of the blood. Transfusion of normal blood is probably ineffective; for in order to be beneficial, it would be needed to be performed within one, or at the most two hours after the gassing, and this in most cases is quite impracticable. Artificial respiration may indeed at times be essential to start spontaneous breathing. Victims of drowning or electrical shock have been saved when the restoration of respiration has been accomplished, but to do so in the case of a man asphyxiated by carbon monoxide is not so simple. Natural breathing may be restored and yet death result hours later."

The importance of publicity, newspaper and otherwise, in public relations of the gas company, was stressed by J. S. S. Richardson, city editor of the Philadelphia Ledger.

"The idea is sometimes prevalent among public utility executives that a newspaper's normal function is to excavate facts and pry open hidden sources of news for publication as general information," the speaker said. "That is quite absurd. It should not be necessary to dig up facts about the public utility business. Every company represented here is a veritable mine of interesting news matter. If you have a man in your office who has the God-given faculty of winning a man's confidence and can handle a matter of publicity or non-publicity, give him the authority to speak for you. Such a man may save you a heartache. You do not have to become loquatious with the press, but avoid the "nothing to say" remark. Many big business men have learned by costly experience not to assume a repellant attitude toward the press on a matter which directly concerns the public."

Mr. Richafdson cited the Pennsylvania Railroad as an example of organized pub-

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The Eternal Feminine

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but maybe it's only ten. The house is beautiful, lounge rooms, billiard rooms, parlors, oodles of them, and a huge sort of sun parlor all decorated in yellow. I sure do like yellow.

I had a dandy time at the luncheon itself. Met women there from absolutely all over the country. At my table was the kindest old lady from Tennessee, oh, yes, and someone from Boston had a daughter who was in the same class at Wellesley as Kate Hilmore. Your know, that little flapper who lives in the next block from us.

I was crazy about a lady, Mrs. Frank I think her name is, who's from—oh, dear, is it Illinois or Ohio? My right hand neighbor though was sort of disagreeable. She wore a big fur all through the luncheon, and every time she moved, with us crowded in so, it tickled my arm. Thought it was a fly at first bothering me.

Why do women wear furs inside the house for anyway?

Harry took me for that ride in the wheel chair this morning. "Hat," he said right after breakfast, "we'll never have peace until you get that chair ride out of your system. Come on." So I tagged along, we got into the chair, and a nigger started pushing.

I sat back with a long breath and was perfectly happy, trying to pretend I had ridden in chairs all my life. Read all the signs, mostly advertising cigarettes and hair nets, along the way and watched all the other people riding up and down.

The ocean was sort of nice this morning, a little rough with waves jumping up and down all over. It gleams so when the sun strikes it. Awful pretty.

What you doing, Nell? Finished that blue morning dress you started last week? Can't imagine why I haven't heard unless it's because you're working hard on that.

Oh! I almost forgot to tell you! Harry said I could have one of those gas fireplaces I told you about. He said he'd give it to me for Christmas. Isn't that great? It won't be long before I show you how delicious those pop overs are that I'm going to have for breakfast every morning when I have a gas oven that dosen't take so long to heat as my old range.

I haven't told you half, but Harry is calling—Guess I'd better not tell what he is calling.

Bye-bye,

"HAT."

P. S.—Is my cat making you any trouble? It was ever so nice of you to keep it for me.

Mathews Tells of Progress In Classifying Accounts

Statistician for Wisconsin Railway Commission Reviews Conditions and Recites Activities of National Association of Railway and Utilities Commissions with Aid of Accounting Committees of Gas and Electric Associations

George C. Mathews, statistician of the Railroad Commission of Wisconsin, brought delegates in the accounting division to their feet with an address yesterday afternoon when he told of the work done towards uniform classification by the National Association of Railway and Utilities Commissioners, with the help of the accounting committees of the American Gas Association and the American Electric Light Association.

"Regulating bodies are not intended to interfere in accounting matters further than is necessary to carry out the purposes for which they were established," he said.

Mr. Mathews' report was the climax of the Accounting Section's afternoon session in which papers read at previous sessions were discussed, and W. G. Murfit, of the Bucks County Public Service Company, Newton, Pa., presented a "small company" paper that brought on spirited discussion.

MATHEWS REVIEWS CONDITIONS

Mr. Mathews, after reviewing conditions which have led to the new system of classification and the efforts of the public utility commissions to require only pertinent and adequate facts, said:

"In 1919 the National Association of Railway and Utilities Commissioners instructed its committee on statistics and accounts to prepare classifications of accounts for the several classes of public utilities, it being evidently the purpose of the Association to prepare the way for uniform accounting throughout the country.

"That accomplishment of this has been due very largely to the constructive help obtained from the accounting committees of the National Electric Light Association and the American Gas Association and by the willingness of those committees to co-operate, without undue insistence on the personal views of their members, in developing the new classifications.

"I think it will not be construed as a claim for undeserved credit for our committee if I say that we, in turn, tried to bear in mind that our purpose was to secure a sound, workable classification to serve the purposes of the industries and the state commissions and not to stand too strongly upon positions marked out by personal preference.

TWO PRINCIPLES KEPT IN VIEW

"Two general principles seem to me to have been kept in view throughout our discussions. First, that it should not be the purpose of state regulatory bodies to impose upon the industry accounting requirements not reasonably necessary to proper administration of the state laws and, second, that gas corporations should not urge any treatment of accounts which would place any real difficulty in the way of the state regulating bodies.

"The attitude which our committee tried to maintain was, as stated in our report to the National Association of Railway and Utilities Commissioners, 'that regulating bodies are not intended to interfere in accounting matters further than is necessary to carry our the purposes for which they were established,' and that 'generally the classification which is best adapted to the needs of the industry will be the one which will furnish commissions with the most reliable information'."

Referring to the elasticity of the system, Mr. Mathews said:

"The classification of accounts prepared for the National Association of Railway and Utilities Commissioners was not intended to be binding to such an extent as to prevent the expansion and subdivision of the system to meet different requirements. It was the hope of those who prepared the classifications that they would be sufficiently elastic to meet almost any set of needs."

SETS A NEW PRECEDENT

Then Mr. Mathews said:

"The National Association classification represents a definite breaking away from the old practice of accounting for additions, betterments and replacements and the adoption of one definite procedure, (1) the credit to fixed capital of the original cost of the property retired with a corresponding charge to the retirement reserve or in some cases to the account Property Abandoned, and (2) the charge to fixed capital of the new unit of property.

"Wherever any replacement involves a charge to the fixed capital accounts the old property is first removed from those accounts so that the thing finally resting in the fixed capital accounts should be the property actually in existence. The Power Commission considers that under the terms of the law it must follow the precedent set by the Interstate Commerce Commission's 1914 classification of road and equipment accounts for steam railways which prescribes an accounting for so-called additions and betterments based upon former railroad practice but not in harmony with the practices and views of most of the state commissions or with the views of the accounting committees of the gas and electrical industries. In the classification of the National Association of Railway and Utilities Commissioners additions and betterments, as described in the Interstate Commerce Commission's system, are unknown.

"As a matter of accounting all property changes such as those constituting additions and betterments in the steam road system, are handled as retirements of the old property and construction of the new."

DISCUSSES APPRAISALS

Touching another problem in relation to engineer appraisals previoulsy referred to in his address, Mr. Mathews said:

"The immediate importance of rate regulation has sometimes resulted in a tendency to overlook or at least to subordinate another principal purpose of public utility regulation whose accomplishment is dependent on correct accounting. This is the supervision of security issues. Here again it is impracticable to depend on engineering of the job which makes it impossible to secure up-to-date appraisals in all cases. Correct accounting for property changes and for discount an dexpense incurred is a necessity on which I need not elaborate.

STATE INTEREST NECESSARY

Concluding, Mr. Mathews stated:

"The interest of state commissions in a great many features of classifications of accounts for utility companies cannot be related to any of the necessities of regulation and may appear to be merely academic, but they are required to establish complete and, generally, exclusive systems. Only in the last few years have the means of effective co-operation between acountants of the industry and those of the states been developed so that classifications might be written which would reflect at all points some real accounting need.

"Many of the state classifications served their purpose well. Others were seriously defective in important respects. The new classification, with such amendments as may be made to maintain uniformity of general structure with the

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Gasmen Warned

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ence not to assume a repellant attitude toward the press on a matter which directly concerns the public. Unbound by any pledge of confidence, the reporters have gone out to get the information through other channels, for nothing stimulates the reportorial instinct more than the knowledge that someone is trying to conceal public information because of some ulterior motive. Consequently, an incomplete and hurtful report of the facts will find its way into the news columns of the papers and all manner of official explanation afterwards will not alter materially the resultant impression upon the public mind.

HAVE A SPOKESMAN

"If you have a man in your office who has the God-given faculty of winning a man's confidence and can handle a matter of publicity or non-publicity as the case may be, give him the authority to speak for you. He will soon get acquainted with the men of the papers and they will learn to trust him. Such a man may save you many a heartache. He will know enough to treat all the newspapers alike, showing no partisanship, playing no favorites. And for heaven's sake don't ever get the idea that a newspaper reporter can be bribed. That is an error which no newspaperman ever will forgive.

"The idea is sometimes prevalent among public utility executives that a newspaper's normal function is to excavate facts and pry open hidden sources of news for publication as general information. That is quite absurd. It should not be necessary to dig up facts about the public utility business. Every company represented here is a veritable mine of interesting news matter that should be on tap at all times through a liaison officer of the organization who appreciates the vital relationship existing between a community necessity and the people who are dependent upon it. Don't wait for the newspapers to ask you for facts. Make the news readily available to them. Withholding the facts until forced by public opinion to release them is not a good way to make friends. Beat the public to it. The public likes it.

"So far as its public relations are concerned, the gas industry in recent years has undergone a complete metamorphosis. I see daily evidence of this in the news matter that reaches my desk and I hear favorable comments which clinch this conviction. I remember, a few years back, when the sight of a gas company president was about as rare as a good five cent cigar. Those were the halcyon days of hard-boiled corporation czars when public relations were poor relations. They were relegated to the back row to make room for dividends and melons.

HOW TIMES HAVE CHANGED

"But observe the change which has come over the face of affairs. During the last year, right here in New Jersey we have had what has been termed a series of one-night stands with the president of a gas company as the star performer, actually mingling with the multitude and shaking hands with the proletariat. In the old days a high corporation official would not only have been fired for such a lapse of official dignity, but an alienist would probably

M. N. DAVIS

have been engaged to overhaul his mental equipment.

"Nowadays, however, it is becoming habitual with your executives to emerge from the seclusion of their frosted windows and hardwood partitions and they are actually mixing with the people who pay them their salaries. Public relationship, in consequence, is on the upward grade. Keep it up. It's great stuff.

"Bankers and other corporation chiefs likewise have hearkened to the public voice in such matters. They are discarding their cages of fancily wrought iron, imported rugs of surpassing thickness and private offices with special entrances and liveried lackeys to refuse admittance to all save the chosen. All that which had the air of mystery and studied secrecy is tumbling. Big men in the East here are coming around to the 'walk-in' spirit which prevails on the Pacific Coast.' Courtesy over the counter is rapidly becoming a by-word of big corporate organizations.

UNWISE TREATMENT HURTS

"A Public Service Commissioner remarked recently that it is not poor engineering practice or plant troubles which irritates the gas consuming public today, but uncivil treatment at the hands of clerical employes in the gas company's offices. But you will find boneheads in all schelons of every organization. That is a situation which will right itself in time. When cranial bone refuses to dissolve, it inevitably is cast out. It is the law.

"I have heard it said also that the finest kind of publicity for a gas company is not the news that is printed on the front page but the little one-inch dividend notice appearing back in the financial columns of the paper. Nothing of the kind. The best publicity your industry can have is that which educates your consumers to a fuller appreciation of the fundamentals of gas service. Too frequently has the reading public noted the pleading of poverty on the front page coincident with the exposure of comfortable prosperity in the financial section of the paper.

"Do you know that the Pennsylvania Ralroad gets more free advertising in the form of news than any other public utility in the world? The principal reason is not that it has a trained force of men making news. Occasionally it may send out information which may properly be classified as propaganda. In addition, however, it stands ready at all times to give the hard, ungarnished facts on any railroad development of general public interest.

HOW THE PENNSY DOES IT

"Now, let us see just what that means. Even on a highly perfected and carefully organized system such as the Pennsylvania wrecks occur in spite of all that can be done to prevent them. Prior to ten years ago a newspaper city editor got his information of such an occurrence from any one of half a dozen sources, a correspondent near the scene of the catastrophe, the friendly interne of a hospital to which had been sent a summons for aid, a telephone operator or even a subscriber. Never the railroad. Nowadays when there is a wreck nine times out of ten the first information comes from the railroad.

In the old days the tip on the accident might have been several hours late. Suppose the wreck occured at 10 o'clock at night and the information failed to reach the morning newspaper offices until 1 o'clock the next morning; very little could be printed about it. The afternoon papers, of course, got busy next day. In the case of a really big wreck involving heavy loss of life anywhere from two to half a dozen re-

STAN GRADY

porters were sent out. One man generally went to the railroad offices but he seldom got any information until long after press time. Everything possible was done by the railroad to prevent the reporters at the scene of the accident from getting the news, which of course, put the newspapers on their mettle. Passengers who have been in a wreck are generally not in a frame of mind making for friendly disposition toward the railroad. Yet their criticisms were quoted freely.

"In the ten or fifteen years of its publicity bureau the Pennsylvania System has convinced the newspapers that it is honest. Today news of a wreck soon after its occurrence is flashed to all newspapers within reach. It goes to the Associated Press in bulletin form and every obtainable shred of information generally is given, the number of killed or injured, their names and addresses, steps being taken for releif, the investigation to establish the blame, the official first estimate of the cause and so on.

"Other railroads have followed a similar course. Their officials are accessible. Records which, under the law ought to be public, are made available to newspapermen. Gas companies can do the same thing. It is not necessary to dig deep for the news. The smallest gas utility maintains a research bureau and laboratory nowadays. Discoveries made therein, together with experiments under way, constitute news if handled properly. More and more are the newspapers devoting space to scientific matters as the public taste becomes educated to such. Explain the inside story of scientific research as the detective does in a big murder story and you have created something of news value."

Convention at Climax

(*Continued from page* 437)

paper on "The State Committee: What It Is and How It Functions," prepared by Joseph B. Groce, New England Committee on Public Utility Information. The discussion on the subject will be led by John C. Mellet, of Indiana; Alfred Fischer, of Michigan; J. B. Sheridan, of Missouri; Paul Warwick, of Georgia, and O. D. Hall, of Oklahoma, each gentleman being the director of the State Committee from where he hails. Joe Carmichael, director of the Iowa committee, will present a paper on "The New State Committee: Problems Met in Getting it Started," which will draw discussion from the following state directors: F. W. Crone, New York; Ross Murphy, Tennessee; George McQuaid, Texas; George E. Lewis, Rocky Mountain committee, and N. W. Lewis, Washington. The final paper of the forum conference will be presented by Director Benjamin E. Ling, of the Ohio committee, entitled "The Old State Committee: Problems Met After Getting it Started." The directors who will discuss the subject will be Horace M. Davis, Nebraska; Frantz Herwig, Wisconsin; Earle W. Hodges, Arkansas.

The annual banquet of the American Gas Association will be held in the American dining-room of the Hotel Traymore, commencing at 7.30 this evening. Members and ladies will attend, and as above mentioned, the principal speech will be made by the Vice-President of the United States, who is coming here exclusively for that purpose.

Standardize Prices

(*Continued from page* 438)

home, connect it and collect its payment. Therefore the manufacturer of standard, advertised brands of gas appliances should place a CONSUMER'S PRICE on it. The gas company should buy it at that consumer's price, less a discount which will take care of our overhead, the interest on our department invested capital and a small profit over and above this.

"The department store and the hardware man would buy just as we do, getting a discount in proportion to the quantities he used. The manufacturer would then make money, the gas company and the department store would be selling appliances at a profit, instead of at a loss and the housewife would be satisfied because she would know that she was equipping her home as cheaply as it could be done. The day of four or five different prices on the same appliance in the same town would then be over.

"This and this only is our course. I think the manufacturers would be willing to co-operate with us if the matter was put up to them in the proper way. There remains two days of the 1922 Convention. There is no time like the present."

Simler Interview

(*Continued from page* 437)

and therefore are in a position to know that quality is always there.

"One of the best illustrations of the fact that the public is coming around to gas heated water is that our business on automatic instantaneous heaters is increasing steadily and at the same time we can truthfully say that business on storage types has not fallen off. We've just gotten out three new storage models and four new automatic instantaneous models and I think all of them are going to be winners."

"How many types do you make, Mr. Simler," asked the reporter.

"Twenty-one in copper, galvanized and in every imaginable size; it's a big line."

"We're awfully glad we came to this convention," continued Mr. Simler. "I've enjoyed meeting the men connected with the gas industry, I know many of them and I've nearly worn my good, right arm off shaking hands with the finest bunch of fellows in the world."

Technical Session

(*Continued from page* 439)

in some ways radically and fundamentally different.

In his work in the solution of the gas distribution problem, Mr. Doherty stated that he found the Thompson Law, which is described as "The most economical area of conductor will be that for which the annual interest on capital outlay equals the annual cost of energy wasted" to be of great value and aid. In designing his distribution system, Mr. Doherty said:

"I divided my system up into transmission mains, feeder mains and distributing mains. My transmission main being the conductor leading from the point of manufacture to and through the distributing system, with a transmiission main at right angle to it at the centre of the load, my feeder mains to be of intermediate

sizes and my distributing mains to be small and inexpensive per lineal foot and not to have any very great conducting capacity, as under the system I had adopted this would not be needed.

"In this work many different kinds of piping were considered, such as paper, fiber, thin pipes protected with cement, various metallic alloy piping, vitrified clay piping, etc. The difficulty of interesting manufacturers to make vitrified clay piping was told by Mr. Doherty to have led to the closing remark of the clay man, "I can deal with vitrified clay but I cannot deal with vitrified minds."

Mr. Doherty concluded his discussion with the following remarks:

"I fear the lack of proper thought and time to write this discussion has made it difficult to understand what I am trying to accomplish by it, so I will say:

(1) That Mr. Griswold's paper should show that there is much to be accomplished by proper planning over what is even today the existing practice.

(2) That I want the young men of the industry to feel they have at least one defender and if they can offer suggestions for improvement of our industry that they can do so without being made an object of ridicule.

(3) That when properly planned there is but little difference in cost between a system designed to carry large quantities of gas and small quantities of gas.

(4) That if we are justified in charging all of the costs of a minimum distributing system to the consumer charge when computing costs on the Readiness-to-Serve basis then this item of charge will be very heavy for this item and very light on the demand item.

(5) That our existing systems can be made to carry a vastly greater amount of gas and enough to displace solid fuel in the home even if dropped to a 300 B. t. u. gas, without any vast expenditure."

Charles A. Munroe, of Chicago, then had a few words to say which admirably brought out the high points in Mr. Griswold's paper. These were the economy of the Doherty system, the fact that it was successfully used for over twenty years, and that the owners of gas plants, who distributed their gas according to this system had been able to solicit house heating business on the basis of this system.

After a few closing remarks by Messrs. Griswold, Doherty and Butterworth, the meeting extended a vote of thanks to Messrs. Cornish and Griswold for the report and paper that they had presented to the meeting.

Mr. Chubb then took the chair and announced that the meeting would continue with the report of the Chemical Committee, which was read by Dr. J. F. Wing, the chairman of the committee. Dr. Wing reported substantial progress in the work of various sub-committees on the testing and valuation of gas oil, on gas purification, waste disposal. The meeting then heard a paper on Deposits in Gas Pipes and Meters by the chairman of the committee of Deposits in Gas Pipes and Meters, R. L. Brown, of the Bureau of Mines, Pittsburgh, Pa.

The program of the meeting also included an extended discussion of this report.

General Session

(*Continued from page* 448)

lic utility efficiency. By informing the public on matters that concern them untold benefits were realized by the railroad, he said.

A. W. Teele, of the firm of public accoutants of Paterson, Teele & Denis, of New York City, emphasized the importance of gas companies having underlying records as accurately and completely compiled as accounts in the higher books because this will simplify the presentation of the company's case when it is appearing before regulatory bodies.

"There is a great necessity, a thing that has been practically overlooked for accurate compilation of underlying records and adjustment," said Mr. Teele. "This work should be done as carefully as the higher records are kept because difficulty is experienced in presenting a case to regulatory bodies if every detail is not accurate and does not have an exact bearing on the final figures. Great care should be taken in recording supplies, such as oil and coal, which from time to time undergo a shrinkage."

Accounting Session

(*Continued from page* 449)

electrical classification, is intened to be the means of furnishing information needed by regulating commissions and by gas corporations. I believe it will come close enough to fulfilling this purpose to justify us all in urging its adoption.

"That it will be found lacking in some respects is altogether likely and though we urge its adoption we must be prepared to accept changes which serve a real purpose. As far as we can see now, the gas corporations must work with accounting systems prescribed by the states for a long time to come. If the same degree of co-operation which has made possible the present classification can be maintained no serious difficulty can result from the necessity of making amendments from time to time."

BALTIMORE SYSTEM DISCUSSED

The Accounting Section started its session with further discussion of papers read Tuesday, particularly on the Baltimore system of accounting.

Mr. Frey, of Allentown, Pa., said that his company now used a card covering four years, to be attached to the meter. Drawings of the position of the meter, with carbon copies for the customer, were now used, Mr. Frey stated, only to check accounts every four months.

E. C. Scobell, of Rochester, N. Y., said he would like to see several companies get together to figure out actual costs of different accounting methods, declaring that costs constitute the real test of accounting methods. Mr. Scobell said that a sales ledger sheet, as used by his company, had advantages in that it rendered possible the instant making of duplicates, saving customers' time.

Reading of Mr. Murfit's paper led Chairman Haase to express thanks that as a result of the paper "the small company man must be heard."

A. R. Keller, of Syracuse, N. Y., talked on "the moral effect of neighbors' opinions," and said if the big companies could get into as close relations with the community as the small companies it would benefit the industry.

OBJECTS TO RUBBER STAMPS

The reports of the Accounting Section's committees and speakers ought to be passed around among the office and plant forces back home, Dewitt C. Clinton, Worcester, Mass., declared. He said he favored the Chicago system, but he expressed his opposition to the use of rubber stamps which had been employed for a long time in the Chicago system. He also favored separate merchandise and gas bills.

W. A. Doering, of Boston, favored billing gas and merchandise separately. Mr. German, of Harrisburg, Pa., said he had experienced no trouble in collecting gas and merchandise bills together.

J. J. Armstrong, of Toronto, said he found billing for both gas and merchandise on the same sheet satisfactory from a collection standpoint and incidentally a help to the sales department. A. S. Corson, of Philadelphia, also favored one bill for both gas and merchandise.

At the Wehrle Company booth—where a stove is to be given "the holder of the lucky number"—are F. E. Riegger, Frank Lee, E. L. Ketchum, E. D. Croker, W. J. Elliott, Edwin Mason, G. M. Cousino and George Schlessenger.

SCHEDULED FOR TODAY

Program

GENERAL SESSIONS

(Convention Hall—Ocean End of Steel Pier)

THURSDAY MORNING, 10 O'CLOCK

Report of Committee on Standard Gas Appliance Specifications.....Wm. T. Rasch, *Chairman*
Consolidated Gas Company of New York, New York City

Address, "The State Committees on Public Utility Information".....J. B. Mullaney
The Peoples' Gas Light and Coke Co., Chicago, Ill.

Address.....Hon. W. D. B. Ainey
Chairman Public Service Commission of the Commonwealth of Pennsylvania, Harrisburg, Pa.

Address, "The Plumber and the Gas Industry" John S. Irvine
President National Association of Master Plumbers of the United States, Detroit, Mich.

Paper, "The Manufacture and Preparation of Coke.....R. L. Fletcher
Assistant Engineer of Manufactur Providence Gas Co., Providence, R. I.

Paper, "The Merchandising of Coke"....W. G. Rich
Manager of Coke Sales Providence Gas Co., Providence, R. I.
(Presented for the Technical Section)

ACCOUNTING SECTION

(Auditorium—Second Floor Steel Pier Boardwalk Front)

THURSDAY AFTERNOON, 2.30 O'CLOCK

Paper, "The Gas Bill Form—Comments and Suggestions".....W. A. Sauer
Comptroller The Peoples' Gas Light and Coke Co., Chicago, Ill.

Report of Committee on Continuous Inventory of Fixed Capital".....H. C. Davidson, *Chairman*
Consolidated Gas Company of New York, New York City.

Report of Committee on Uniform Classification of Accounts.....W. J. Meyers, *Chairman*
United Electric Light and Power Co., New York City.

Report of Committee on State Representative W. A. Sauer, *Chairman*
The Peoples' Gas Light and Coke Co., Chicago, Ill.

COMMERCIAL AND PUBLICITY AND ADVERTISING SECTIONS

(Haddon Hall—Vernon Room)

THURSDAY AFTERNOON, 2.30 O'CLOCK

Address, "Salesmanship in Public Relations E. J. Cooney
Sales and Service Manager Lowell Gas Light Co., Lowell, Mass.

Address, "Relation of Home Cooking to Gas Sales".....Mrs. Anna J. Peterson
Director Home Service Department The Peoples' Gas Light and Coke Co., Chicago, Ill.

Paper, "The Two-fold Value of Efficient Application of Industrial Gas".....D. W. Chapman
The Peoples' Gas Light and Coke Co., Chicago, Ill.

TECHNICAL SECTION

(Convention Hall—Ocean End of Steel Pier)

THURSDAY AFTERNOON, 2.30 O'CLOCK

Report of Committee on Gas Plant and Production Geo. H. Waring, *Chairman*
American Public Utilities Co., Grand Rapids, Mich.

Paper, "Some Observations on the Use of the Doherty Washer Cooler as a Water Gas Condenser".....F. W. Steere
Vice-President Steere Engineering Co., Detroit, Mich.

Paper, "Proper Scrubbing and Condensing Facilities of a Coal Gas Plant and Their Effect Upon Tar and Ammonia Recovery".....J. R. Wohrley
Efficiency Engineer H. L. Doherty & Co., New York City

General Topics for Discussion.

REGISTRATIONS GROWS AS GASMEN REACH CONVENTION

All Records Broken With Daily Arrival of Thousands—Late Visitors Find Gathering In Full Swing.

The following list covers the registration of members and guests of the Association up to Wednesday afternoon. This list was furnished by the American Gas Association.

A

Allen, G. W.; Boston, Mass.; Marlborough-Blenheim.
Althen, G. R.; Baltimore, Md.; Ritz-Carlton.
Allington, John B.; Rochester, N. Y.; Ambassador.
Andrew, H. O.; Springfield, Mass.; Traymore.
Anderson, H. B.; Philadelphia, Pa.; Marlborough-Blenheim.
Anthony, F. E.; Pittsburgh, Pa.; Chalfonte.
Atwood, B. H.; Wilmington, Del.; Traymore.
Abbott, M. E.; Taunton, Mass.; Traymore.
Adams, Walter J.; Long Island, N. Y.; Alamac.
Adams, Henry C.; Pittsburgh, Pa.; Traymore.
Ackerman, Richard; Englewood, N. J.; Haddon Hall.
Albricht, Emil; Newark, N. J.; Shelburne.
Allen, E. W.; Lynn, Mass.; Traymore.
Anderson, J. C.; Elizabeth, N. J.; Haddon Hall.
Atherton, Edgar; Patterson, N. J.; Haddon Hall.
Auringer, H. W.; Newark, N. J.; Shelburne.
Austin, James; Ocean City, N. J.; 839 Asbury Ave., Ocean City, N. J.

B

Beebe, F. H.; Fort Wayne, Ind.; Traymore.
Beebee, A. M.; Rochester, N. Y.; Ambassador.
Beaumont, R. H.; Philadelphia, Pa.; Dennis.
Brine, F. A.; Atlanta, G.; Marlborough-Blenheim.
Barnes, C.; Boston, Mass.; Haddon Hall.
Baker, Frank J.; Chicago, Ill.; Traymore.
Baker, A. W.; Danbury, Conn.; Marlborough-Blenheim.
Battin, H. S.; Philadelphia, Pa.; Traymore.
Battin, H. W.; Camden, N. J.; Marlborough-Blenheim.
Bauer, Edward H.; Providence, R. I.; Traymore.
Bean, B. J.; Hyde Park, Mass.; Haddon Hall.
Bennett, H. E.; Cherokee, Iowa; Marlborough-Blenheim.
Bendergraph, H. A.; Montgomery, Ala.; Ambassador.
Blanchard, F. L.; New York City; Traymore.
Boyd, Wm. F.; Philadelphia, Pa.; Strand.
Bush, R. W.; Brooklyn, N. Y.; Traymore.
Berger, H. C.; Cleveland, Ohio; Shelburne.
Belte, Geo. B.; Arlington, Mass.; Traymore.
Boyd, A. M.; Philadelphia, Pa.; Strand.
Brayer, John F.; Rochester, N. Y.; Schlitz.
Brundage, H. M.; New York City; Traymore.
Brady, John C.; New York City; Goodfellow.
Brau, E. W.; Minneapolis, Minn.; Marlborough-Blenheim.
Bradley, C. W.; Chicago, Ill.; Traymore.
Brown, J. A.; Jackson, Mich.; Traymore.
Brown, J. Everett; Ardmore, Pa.; Traymore.
Brumbaugh, E. C.; Philadelphia, Pa.; Traymore.
Burritt, D. F.; Chicago, Ill.; Traymore.
Barthold, W. H.; New York City; Traymore.
Barley, E. M.; Newark, N. J.; Haddon Hall.
Balsam, H. M.; Haverstraw, N. Y.; Traymore.
Barr, Robt.; Baltimore, Md.; Shelburne.
Barry, E. G.; Toms River, N. J.
Beenz, H.; Paterson, N. J.; Strand.
Beadenkopf, Geo.; Baltimore, Md.; Marlborough-Blenheim.
Bratton, S. C.; Birmingham, Ala.; Traymore.
Brant, A.; Newark, N. J.; Shelburne.
Brown, J. W.; Rochester, N. Y.; Ambassador.
Brown, R. L.; Pittsburgh, Pa.; Chalfonte.
Breese, Fred S.; Montclair, N. J.; Haddon Hall.
Bond, C. D.; Brooklyn, N. Y.; Traymore.
Burdick, R. H.; New York City; Chalfonte.
Benedict, D. B.; New Brunswick, N. J.; Haddon Hall.
Butt, George; Glen Falls, N. Y.; Seaside.

C

Cauffman, S. H.; Newark, N. J.; Shelburne.
Charles, L. A.; Jersey City, N. J.; Haddon Hall.
Chapman, D. W.; Chicago, Ill.; Strand.
Chamberlain, G. R.; Grand Rapids, Mich.; Traymore.
Covell, S. A.; Baltimore, Md.; Traymore.
Curran, R. B.; New London, Conn.; Traymore.
Cooper, Stuart; Charleston, S. C.; Strand.
Castor, W. A.; Philadelphia, Pa.; Seaside.
Chibbum, E. M.; Davenport, Iowa; Traymore.
Conner, Ralph S.; Malden, Mass.; Haddon Hall.
Chewning, W. L.; Philadelphia, Pa.; Traymore.
Carr, W. D. L.; Hammond, Ind.; Traymore.
Collier, Charles A.; Atlanta, Ga.; Chalfonte.
Cofer, H. C.; Richmond, Va.; Bothwell.
Colie, S. T.; Camden, N. J.; Haddon Hall.
Campbell, D. A.; Danbury, Conn.; Traymore.
Carroll, Chas. E.; New Bedford, Mass.; Traymore.
Corson, A. S.; Philadelphia, Pa.; Strand.
Cornish, R. C.; Philadelphia, Pa.; Ritz-Carlton.
Carter, C. F.; Nashville, Tenn.; Marlborough-Blenheim.
Cauble, D. E.; High Point, N. C.; Ambassador.
Coffman, E. F.; Camden, N. J.; Marlborough-Blenheim.
Chase, A. W.; Manchester, N. H.; Marlborough-Blenheim.
Clark, J. A., Jr.; Newark, N. J.; Strand.
Clay, N. T.; Winston-Salem, N. C.; Breakers.
Connelly, H. T.; Annapolis, Md.; Wiltshire.
Cougevan, T. M.; Rochester, N. Y.; Ambassador.
Craner, Mary G.; Norristown, Pa.
Crone, F. W.; New York City; Dennis.
Craven, G.; New York City; Traymore.
Crawford, E. M.; Greensborough, N. C.; Breakers.
Crawford, H. M.; San Francisco, Cal.; Breakers.
Cullen, G. L.; Harrisburg, Pa.; Traymore.
Curley, Thomas F.; Stapleton, N. Y.; Haddon Hall.
Curtis, S. P.; Philadelphia, Pa.; Ambassador.
Collier, W. R.; Poughkeepsie, N. Y.; Chalfonte.
Calkins, F. S.; Fort Wayne, Ind.; Traymore.
Carlon, P. C.; Somerville, N. J.; Haddon Hall.
Cartwright, H. R.; Philadelphia, Pa.
Causbrook, W. R.; Plainfield, N. J.; Haddon Hall.
Chadwell, W. H.; Newark, N. J.; Strand.
Choquette, S. E.; Woonsocket, R. I.; Marlborough-Blenheim.
Cleary, Ed.; Burlington, Ia.; Marlborough-Blenheim.
Collins, Roy B.; Asbury Park, N. J.; Shelburne.
Cohn, Chas. M.; Baltimore, Md.; Traymore.
Conroy, J. F.; New York City; Traymore.
Conover, John L.; Newark, N. J.; Shelburne.
Coombs, Fred S.; Youngstown, Ohio; Marlborough-Blenheim.
Crowell, H. H.; Philadelphia, Pa.; Chalfonte.
Crowley, J. P.; St. Paul, Minn.; Traymore.
Creetcher, W. H.; Oklahoma City, Okla.; Marlborough-Blenheim.
Culver, O. T.; Newark, N. J.; Shelburne.
Cushing, A. G.; Montreal, Can.; Ritz-Carlton.

D

Daly, W. B.; Cleveland, Ohio; Ritz-Carlton.
Davidson, H. C.; New York City; Traymore.
Davey, A. F.; Sheboygan, Wis.; Ritz-Carlton.
Davis, J. D.; Pittsburgh, Pa.; Chalfonte.
DeFrese, S. E.; Chattanooga, Tenn.; Traymore.
Dell Plain, Morse; Hammond, Ind.; Ambassador.
Demorest, D. J.; Columbus, O.; Marlborough-Blenheim.
Degner, A. M.; Brooklyn, N. Y.
Dennis, C.; Newark, N. J.; Strand.
Dimock, Clarence V.; New Haven, Conn.; Traymore.
Dold, Geo. T.; Burlington, N. J.; Haddon Hall.
Dorsch, Peter M.; Washington, D. C.; Haddon Hall.
Douglas, J. B.; Philadelphia, Pa.; Traymore.
Douglass, Henry W.; Ann Arbor, Mich.; Traymore.
Downs, G. B.; Toledo, Ohio; Traymore.
Durell, C. M.; Spencer, Mass.; 21 S. Indiana Ave.
Dutton, L. R.; Jenkintown, Pa.; Haddon Hall.
Drake, Francis E.; Lynn, Mass.; Traymore.
Davis, Harold G.; Danbury, Conn.; Traymore.
Derby, Wm. L.; Trenton, N. J.; Strand.
Dickinson, W. S. R.; Newark, N. J.; Shelburne.
Durr, E. C.; Newark, N. J.; Haddon Hall.

E

Eaton, C. J.; Chicago, Ill.; Marlborough-Blenheim.
Eaton, H. M.; Detroit, Mich.; Ambassador.
Earle, W. H.; Rochester, N. Y.; Ambassador.
Earl, Alfred G.; Bristol, R. I.; Haddon Hall.
Edmonston, Miss Ena; Norristown, Pa.
Elmann, E. W.; Gloversville, N. Y.; Chalfonte.
Eichengreen, L. B.; Philadelphia, Pa.; Strand.
Eigenbrot, John L.; Lowell, Mass.; Traymore.
Earnshaw, E. H.; Newark, N. J.; Strand.

F

Foley, R. A.; Syracuse, N. Y.; Ambassador.
Ferdon, C. J.; Brooklyn, N. Y.; Traymore.
Ferris, H. H.; Newark, N. J.; Strand.
Finegan, E. S.; Keyport, Pa.
Fischer, A.; Ann Arbor, Mich.; Traymore.
Felton, J. G.; LaCrosse, Wis.; Strand.
Fletcher, R. L.; Providence, R. I.; Traymore.
Flick, R. H.; Salina, Kan.; Traymore.
Folger, O.; Hackensack, N. J.; Ambassador.
Forstall, A. E.; Mauch Chunk, Pa.; Haddon Hall.
Fox, E. W.; Norristown, Pa.
France, F.; Newark, N. J.; Traymore.
Frankebergie, A. L.; Phoenixville, Pa.; Elberon.
Frick, J. A.; Allentown, Pa.; Traymore.
Fry, John A.; Detroit, Mich.; Ritz-Carlton.

G

Gadsden, P. H.; Philadelphia, Pa.; Traymore.
Gardner, B. H.; Lafayette, Ind.; Marlborough-Blenheim.
Gibson, T. A.; Montgomery, Ala.; Ambassador.
Giffard, N. W.; Boston, Mass.; Haddon Hall.
Gonnoud, A. J.; Brooklyn, N. Y.; Traymore.
Good, E. J.; Lafayette, Ind.; Marlborough-Blenheim.
Grayson, J. H.; Athens, Ohio; Breakers.
Gross, H. C.; Pensacola, Fla.; Marlborough-Blenheim.
Gartley, W. H.; Philadelphia, Pa.; 3 Sacramento Ave.
Gaston, Luther; Lebanon, Pa.; Traymore.
Grey, Chester; Lansing, Mich.; Traymore.
Gwinner, Ernest E.; Ann Arbor, Mich.; Traymore.
Geist, C. H.; Philadelphia, Pa.; Seaview Golf Club.
Green, Albert; Philadelphia, Pa.; Strand.

H

Haftenkamp, J. P.; Rochester, N. Y.; Ambassador.
Haligburton, H. S.; Manayunk, Pa.; Strand.
Harris, L. M.; Hackensack, N. J.; Marlborough-Blenheim.
Hainsdale, J. H.; Meriden, Conn.; Traymore.
Henderson, Edward R.; Blackstone, Va.; Breakers.
Hall, E. S.; Springfield, Mass.; Traymore.
Hale, W.; Boston, Mass.; Chalfonte.
Hanlan, James P.; Newark, N. J.; Strand.
Hartsfield, B. H.; Birmingham, Ala.; Breakers.
Hawks, A. W., Jr.; Baltimore, Md.; Dennis.
Harse, G. E.; Lincoln, Neb.; Traymore.
Hayler, George E.; New York City; Traymore.
Heller, Max; Philadelphia, Pa.
Henderson, Chas. R.; Ann Arbor, Mich.; Traymore.
Herfort, P.; New York City; Dennis.
Herrell, Lee L.; Washington, D. C.; Haddon Hall.
Hockley, H. C.; Baltimore, Md.; Traymore.
Hoffman, Chas. L.; Reading, Pa.; Traymore.
Holbrook, A. A.; Stroudsburg, Pa.; Westminster.
Hole, R. J.; Greensboro, N. C.; Ambassador.
Horning, G. R.; Salt Lake City, Utah; Dennis.
Howard, A. C.; New York City; Traymore.
Howell, Fisher; Baltimore, Md.; Traymore.
Hudson, Darwin S.; New York City; Traymore.
Hirst, H. F.; Chicago, Ill.; Traymore.
Hutchins, H. C.; Camden, N. J.; Haddon Hall.
Hutchinson, W. P.; Bridgeport, Conn.; Traymore.
Hutchings, J. T.; Philadelphia, Pa.; Traymore.

I

Ide, Charles E.; New York City; Traymore.
Ireland, S. B.; Montgomery, Ala.; Ambassador.
Ingwall, F. F.; Binghamton, N. Y.; Ambassador.

J

Jackman, E. G.; Toronto, Can.; Dennis.
Jones, Jacob B.; Bridgeton, N. J.; Normandy.
Jardine, D. W.; Burlington, Vt.; Traymore.
Jeffers, Geo. L.; Gloversville, N. Y.; Chalfonte.
Jennings, F. W.; Framingham, Mass.; Haddon Hall.
Johnson, J. L.; Providence, R. I.; Traymore.
Jones, David; Pottstown, Pa.; Morton.
Joslin, M. R.; Atlantic Highlands, N. J.

K

Kahn, B. B.; Hamilton, Can.
Kain, Robert E.; Ardmore, Pa.; Traymore.
Kuehn, Paul M.; Baltimore, Md.; Traymore.
Keller, E. N.; Norristown, Pa.
Kellogg, L. L.; Sioux City, Iowa; Traymore.
Killgore, F. D.; Philadelphia, Pa.; Strand.
Klein, A. C.; Boston, Mass.; Strand.
Knoolton, R. H.; Philadelphia, Pa.; Ambassador.
Krausse, Chas. C.; Baltimore, Md.; Haddon Hall.
Kretschmar, F. K.; Boston, Mass.; Ritz-Carlton.
Kruger, R. E.; East Rochester, N. Y.; Ambassador.

L

Lacey, W. R.; Milwaukee, Wis.; Haddon Hall.
La Wall, H. J.; Philadelphia, Pa.; Dennis.
Landis, H. K.; New York City; Ritz-Carlton.
Lamson, W. O.; West Chester, Pa.; Shelburne.
Lawrence, W. F.; Astoria, L. I.; Dennis.
Lawlor, R. H.; Flint, Mich.; Traymore.
Lea, D. C.; Hattisburg, Miss.; Traymore.
Leichner, Chas. W. H., Jr.; Camden, N. J.; Marlborough-Blenheim.
Lidby, J. L.; Salem, Mass.; Traymore.
Linton, Sam; Nashville, Tenn.; Ambassador.
Loiselle, C. H.; Beacon, N. Y.
Loyd, H.; Philadelphia, Pa.; Traymore.
Lucas, J. Thomas; Minneapolis, Minn.; Marlborough-Blenheim.

Lucas, T. J.; Chicago, Ill.; Traymore.
Lucena, J.; Syracuse, N. Y.; Chalfonte.
Lyman, John D.; Easthampton, Mass.; Marlborough-Blenheim.
Lyons, B. F.; Beloit, Wis.; Traymore.
Lawton, Frayk B.; Newport News, Va.; Traymore.
Leinrath, J. P.; Newark, N. J.; Haddon Hall.

M

MacArthur, D.; Jersey City, N. J.; Traymore.
Macbeth, Geo. T.; Mt. Vernon, N. Y.; Chalfonte.
MacSweeney, J. P.; Rochester, N. Y.; Ambassador.
McCorkindale, W. J.; Roanoke, Va.; Traymore.
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McInerny, W. A.; South Bend, Ind.; Ambassador.
McKenzie, W. H.; Kansas City, Kan.; Marlborough-Blenheim.
Manier, R. L.; Syracuse, N. Y.; Chalfonte.
Marks, Alexander A.; Lansdale, Pa.
Marsden, C. P.; Newark, N. J.; Shelburne.
Marshall, F. L.; Augusta, Ga.; Ritz-Carlton.
Martin, E. H.; Des Moines, Iowa; Marlborough-Blenheim.
Major, W. A., Jr.; Newark, N. J.; Shelburne.
Menard, R. W.; Boston, Mass.; Chalfonte.
Merrille, H.; Tonewanda, N. Y.; Traymore.
Merritt, Elwood H.; Niagara Falls, N. Y.; Dennis.
Miller, E. F.; Merchantville, N. J.; Marlborough-Blenheim.
Miller, Wm. A.; Cincinnati, Ohio; Traymore.
Miller, V. A.; Rochester, N. Y.; Ambassador.
Millward, S. C.; Atlantic City, N. J.; 21 S. Little Rock.
Milner, E. D.; Baltimore, Md.; Haddon Hall.
Mitchell, O., Jr.; Atlanta, Ga.; Marlborough-Blenheim.
Morgan, Chas. S.; Rochester, N. H.; Breakers.
Morris, W. A.; Brooklyn, N. Y.; Traymore.
Morrison, H. K.; Lynn, Mass.; Traymore.
Morse, C. S.; Portsmouth, Va.; Chalfonte.
Mowen, I. E.; Des Moines, Iowa; Shelburne.
Mulholland, S. E.; Fort Wayne, Ipd.; Marlborough-Blenheim.
Murdock, P.; New York City; Marlborough-Blenheim.
Murphy, Ross; Nashville, Tenn.; Ambassador.
Murphy, E. J.; Brooklyn, N. Y.; Strand.
Murray, J. L.; Biddeford, Me.; Traymore.

N

Nettleton, Charles H.; Derby, Conn.; Traymore.
Norcross, J. A.; New Haven, Conn.; Traymore.
Norris, Rollin; Philadelphia, Pa.; Traymore.
Norton, W. F.; Nashua, N. H.; Marlborough-Blenheim.
Norwood, W. C., Jr.; La Porte, Ind.; Chalfonte.

O

O'Connell, J. J.; Amherst, Mass.; Marlborough-Blenheim.
O'Donnell, W. F.; Philadelphia, Pa.; Traymore.

P

Parish, Wm. H.; Philadelphia, Pa.; Chalfonte.
Patrick, J. S.; Burlington, Vt.; Traymore.
Patterson, R. H.; North Adams, Mass.; Traymore.
Pettengill, R. A.; Chicago, Ill.; Traymore.
Peterson, O. F.; Long Island, N. Y.; Dennis.
Pfeifeer, B. V.; Philadelphia, Pa.; Dennis.
Pfeifeer, B. V.; Philadelphia, Pa.; Dennis.
Phillips, R. E.; Lincoln, Neb.; Traymore.
Plantinga, P.; Cleveland, Ohio; Traymore.
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Powell, A. R.; Pittsburgh, Pa.; Chalfonte.
Prather, R. V.; Springfield, Ill.; Traymore.
Prichard, G. R.; Lowell, Mass.; Traymore.
Priest, G. H.; Brockton, Mass.; Ambassador.
Puryear, W. R.; Baltimore, Md.; Haddon Hall.

Q

Quinn, John J.; Quincy, Mass.; Alamac.

R

Rawson, Erwin; St. Louis, Mo.; Breakers.
Reading, H. B.; Brooklyn, N. Y.; Marlborough-Blenheim.
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Richa, Edward L.; Baltimore, Md.; Ritz-Carlton.
Robbins, M. C.; New York City; Ritz-Carlton.
Roberts, Geo. L.; Bristol, Conn.; Shelburne.
Roper, M. P.; Rockford, Ill.; Traymore.
Russell, Z. Z.; Salisbury, N. C.; Ambassador.
Rusby, R.; Philadelphia, Pa.; Traymore.
Russell, C. W.; Binghamton, N. Y.; Ambassador.
Ryder, D. R.; Jersey City, N. J.; Haddon Hall.

S

Sanford, H. S.; Pittsburgh, Pa.; Traymore.
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Schornstein, F. E.; Eau Claire, Wis.; Ritz-Carlton.
Schroder, Fred; New York City; St. Charles.
Schroeder, A. G.; Grand Rapids, Mich.; Traymore.
Schuck, C., Jr.; East Orange, N. J.; Traymore.
Scobell, E. C.; Rochester, N. Y.; Ambassador.
Searing, R. B.; Sioux City, Iowa; Traymore.
Sebald, H. A.; Coldwater, Mich.; Ambassador.
Senator, A.; Philadelphia, Pa.; Strand.
Serrill, Wm. J.; Philadelphia, Pa.; Traymore.
Seybolt, J. E.; Portsmouth, N. H.; Ambassador.
Seymour, W. W.; Battle Creek, Mich.; Traymore.
Shattuck, J. D.; Chester, Pa.; Ritz-Carlton.
Short, A. F.; Providence, R. I.; Strand.
Shreve, W. E.; Camden, N. J.; Haddon Hall.
Smart, Burton; Portland, Me.; Haddon Hall.
Smith, G. E.; Jersey City, N. J.; Haddon Hall.
Smith, Geo. H.; Poughkeepsie, N. Y.; Chalfonte.
Smith, John C.; Stapleton, N. Y.; Haddon Hall.
Smith, Oliver H.; Long Island City, N. Y.; Dennis.
Smith, W. L.; Battle Creek, Mich.; Traymore.
Stiles, G. W.; Portland, Me.; Haddon Hall.
Spangel, E. L.; Rochester, N. Y.; Ambassador.
Sperry, R. E.; Baltimore, Md.; Traymore.
Stead, Julius; Boston, Mass.; Bothwell.
Steere, F. W.; Detroit, Mich.; Traymore.
Stein, Louis; Eau Claire, Wis.; Ritz-Carlton.
Stephany, E. J.; Pittsburgh, Pa.; Traymore.
Stephen, G. E.; Worcester, Mass.; Haddon Hall.
Sterrett, H. R.; Des Moines, Iowa; Traymore.
Stevenson, H. R.; Sioux City, Iowa; Traymore.
St. John, John; Madison, Wis.; Traymore.
Stone, Thomas W.; Fort Wayne, Ind.; Traymore.
Strader, R. H.; New York City; Dennis.
Strueburg, G. H.; Tonawanda, N. Y.; Traymore.
Swartz, M. G.; Cleveland, Ohio; Schlitz.
Sykes, W. C.; Rochester, N. Y.; Ambassador.

T

Talbott, F.; Danville, Va.; Ambassador.
Taylor, H. G.; Lawrence, Mass.; Traymore.
Taylor, Chas. H.; Danbury, Conn.; Marlborough-Blenheim.
Teahry, Thomas M.; New York City; Marlborough-Blenheim.
Tenney, A. B.; Boston, Mass.; Traymore.
Thorne, F. A.; New York City; Dennis.
Thomson, John; Chicago, Ill.; Traymore.
Tierney, J. W.; St. Charles, Mo.; Traymore.
Timm, Chas. F.; New York City; Chalfonte.
Tooker, J. G.; Salina, Kan.; Traymore.
Trull, Clifford; New London, Conn.; Traymore.
Tuttle, F. A.; Newark, N. J.; Haddon Hall.

U

Uhlig, E. C.; Brooklyn, N. Y.; Strand.

V

Verge, V. E.; New London, Conn.; Traymore.
Vecker, S. P.; Panama, Rep. of Panama; Traymore.
Vincent, G. I.; Syracuse, N. Y.; Chalfonte.
Vittinghoff, H.; Boston, Mass.; Traymore.

W

Walker, A. C.; New York City; Chalfonte.
Ware, L. H.; Martinsburg, W. Va.; Asbury Ave. Ocean City.
Warner, Harry; Spokane, Wash.; Traymore.
Weil, M. S.; Philadelphia, Pa.; Traymore.
White, Wallace A.; Richmond, Va.; Chalfonte.
Whitcomb, H. D.; Newark, N. J.; Strand.
Wharkin, J. S. M.; Helena, Ark.; Traymore.
Weber, F. C.; New York City; Ritz-Carlton.
Werner, Louis H.; New York City; Traymore.
Weldy, A.; Bridgeton, N. J.; Normandy.
Williams, L. S.; Harrisburg, Pa.; Traymore.
Wilson, P. A.; Philadelphia, Pa.
Wilson, H. T.; Cleveland, O.; Bellevue-Stratford, Phila.
Wilson, H. A.; Newark, N. J.; Marlborough-Blenheim.
Wilson, L. B., Jr.; Baltimore, Md.; Dennis.
Wing, J. F.; Boston, Mass.; Haddon Hall.
Wolfe, John H.; Baltimore, Md.; Traymore.
Wolfgram, I. F.; Norristown, Pa.; Seaside.
Wood, W. A.; Boston, Mass.; Ritz-Carlton.
Woodward, H. J.; Atlanta, Ga.; Marlborough-Blenheim.
Wyer, S. S.; Columbus, Ohio; Traymore.
Wynne, L. F.; Atlanta, Ga.; Marlborough-Blenheim.

Y

Yeomans, Bert B.; Rochester, N. Y.; Ambassador.
Young, J. T.; Grand Rapids, Mich.; Traymore.
Young, P. S.; Newark, N. J.; Traymore.
Young, R. W. H.; Elrama, Pa.; Traymore.

Z

Zeck, R. N.; Michigan City, Ind.; Traymore.
Zingg, F. E.; East Orange, N. J.
Zingg, J. P.; Orange, N. J.; Haddon Hall.

GUESTS

A

Anthony, Mrs. F. E.; Pittsburgh, Pa.; Chalfonte.
Althen, Mrs. G. R.; Baltimore, Md.; Ritz-Carlton.
Allen, L. E.; Bridgeton, N. J.; Normandie.
Allen, Mrs. G. W.; Boston, Mass.; Marlborough-Blenheim.
Allen, Benj. T.; Harrisburg, Pa.; New Holland.
Anderson, Mrs. J. C.; Elizabeth, N. J.; Haddon Hall.

B

Beebee, Mrs. A. M.; Rochester, N. Y.; Ambassador.
Blanchard, Mrs. F. L.; New York City; Traymore.
Brewster, F. R.; New York City; Traymore.
Bremer, G. S.; Pittsburgh, Pa.
Brundage, Mrs. H. M.; New York City; Traymore.
Brady, Mrs. J. C.; New York City; Goodfellow.
Brown, Albert J.; Concord, N. H.; Traymore.
Broadwater, C. C.; New York City; Haddon Hall.
Berry, Geo. E. G.; Ocean City, N. J.
Buck, Geo. V., Jr.; Philadelphia, Pa.
Beudel, H. H.; Newark, N. J.; Marlborough-Blenheim.
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Barr, Mrs. Robt.; Baltimore, Md.; Shelburne.

C

Caster, Mrs. W. A.; Philadelphia, Pa.; Seaside.
Chapman, Mrs. D. W.; Chicago, Ill.; Strand.
Chamberlain, G. R.; Grand Rapids, Mich.; Traymore.
Chewning, Mrs. W. L.; Philadelphia, Pa.; Traymore.
Cauffman, Mrs. S. H.; Newark, N. J.; Shelburne.
Clayton, Mrs. T. R.; Providence, R. I.; Traymore.
Carroll, Wm. A.; New Bedford, Mass.; Traymore.
Carroll, Mrs. Wm. A.; New Bedford, Mass.; Traymore.
Carroll, Mrs. Chas. E.; New Bedford, Mass.; Traymore.
Corson, Mrs. A. S.; Philadelphia, Pa.; Strand.
Carter, Mrs. C. F.; Nashville, Tenn.; Marlborough-Blenheim.
Conner, R. M.; Philadelphia, Pa.; Traymore.
Crawford, Mrs. H. M.; San Francisco, Cal.; Breakers.
Cullen, Mrs. G. L.; Harrisburg, Pa.; Traymore.
Curtis, Mrs. S. P.
Clark, Mrs. H. H.; Chicago, Ill.; Marlborough-Blenheim.
Carpenter, Norman; Baltimore, Md.; Haddon Hall.
Caspen, Mrs. F. F.; Breakers.
Carter, Geo. B.; Detroit, Mich.; Craig Hall.
Conroy, Mrs. J. P.; New York City; Traymore.
Causbrooke, Mrs.; Plainfield, N. J.; Haddon Hall.
Crowly, Mrs. J.; St. Paul, Minn.; Traymore.

D

Davidson, Mrs. H. C.; New York City; Traymore.
Davey, Mrs. A. F.; Sheboygan, Wis.; Ritz-Carlton.
Dean, R. V.; Atlantic City, N. J.; A. C. Gas Co.
Dillon, Miss M.; New York City; Goodfellow.
Dorsch, Mrs. Peter; Washington, D. C.; Haddon Hall.
Douglas, Mrs. J. B.; Philadelphia, Pa.; Traymore.
Durell, Rev. H. E. A.; Spencer, Mass.; 21 S. Indiana Ave.
Durell, Mrs. C. M.; Spencer, Mass.; 21 S. Indiana Ave.
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Doxsey, E. C.; Toms River, N. J.

E

Earl, Mrs. A. G.; Bristol, R. I.; Haddon Hall.
Ehlers, Peter; Philadelphia, Pa.; Chalfonte.
Ehlers, Mrs. Peter; Philadelphia, Pa.; Chalfonte.
Eggleston, Mrs. L. W.; Buffalo, N. Y.; Chalfonte.

F

Fairfield, C. L.; Boston, Mass.; Traymore.
Farrell, Mrs. J. L.; Passaic, N. J.; Strand.
Fretz, Edw.; Long Island City, N. Y.; Dennis.
France, Mrs. F.; Newark, N. J.; Traymore.
Framle, W. A.; Chicago, Ill.; Traymore.
Fretz, Mrs. Edw.; Long Island City, N. Y.; Dennis.

G

Gardner, Mrs. P. D.; Bayonne, N. J.; Strand.
Gardner, Miss N.; Bayonne, N. J.; Strand.
Green, L. E.; Toms River, N. J.
Griswold, Mrs. R. G.; New York City; Traymore.
Gifford, Miss A. H.; Boston, Mass.; Haddon Hall.
Gifford, Mrs. N. W.; Boston, Mass.; Haddon Hall.
Gray, S. H.; Mt. Union, Pa.; Haddon Hall.
Gosnell, L. A.; Bridgeton, N. J.; Normandie.
Grossman, D.; Atlantic City, N. J.; A. C. Gas Co.
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H

Hallerian, Richard J.; Philadelphia, Pa.; Continental.
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Hoyt, Mrs. F. G.; New York City; St. Charles.
Hutchinson, Marion; Bridgeport, Conn.; Traymore.
Harris, Ralph A.; Bridgeport, N. J.; Normandie.
Heubeck, Geo. F.; Baltimore, Md.; Haddon Hall.
Heubeck, Mrs. G. F.; Baltimore, Md.; Haddon Hall.
Hicks, Mrs. H. J.; Norfolk, Va.; Marlborough-Blenheim.
Hicks, H. J.; Norfolk, Va.; Marlborough-Blenheim.
Hoffman, Isabelle; Atlantic City, N. J.; A. C. Gas Co.
Hudson, Mrs. D. S.; New York City; Traymore.
Hurst, Mrs. H. F.; Chicago, Ill.; Traymore.
Hutchinson, Mrs. W.; Bridgeport, Conn.; Traymore.
Haftenkamp, Mrs. J. P.; Rochester, N. Y.; Ambassador.

J

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Jeffers, Mrs. Geo. L.; Gloversville, N. Y.; Chalfonte.
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Johnson, Ethyl M.; Chester, Pa.; Traymore.
Joslin, Harry; Philadelphia, Pa.

K

Kellogg, Mrs. L. L.; Sioux City, Iowa; Traymore.
Kennedy, C. J.; Stapleton, N. Y.; Haddon Hall.
Kennedy, Thos. R.; Rochester, N. Y.; Schlitz.
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Kelly, Miss H.; New York City; Strand.

L

Ling, Ben. E.; Cleveland, Ohio; Marlborough-Blenheim.
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Lohr, F. D.; Jersey City, N. J.; Traymore.
Lowe, Percy; New York City; Chalfonte.
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LeWall, Mrs. H. J.; Boston, Mass.; Dennis.
Lambert, I. O.; Philadelphia, Pa.; Dennis.

M

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Macgill, Wm. H.; Washington, D. C.; Glaslyn-Chatham.
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Mattox, Steven; Toms River, N. J.
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McHale, Albert; Atlantic City, N. J.
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McMonatle, Daniel; Philadelphia, Pa.; Strand.
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Michal, Mrs. C.; Haddon Hall.
Morley, L. M.; Philadelphia, Pa.
Mosteller, W. P.; Philadelphia, Pa.; Ambassador.
Mulhern, Jas.; Newtown, Pa.; Breakers.
Mullarkey, J. J.; Camden, N. J.; Haddon Hall.
Murphy, H. N.; Chicago, Ill.; Traymore.
Miell, J. L.; Philadelphia, Pa.; Elwood.
Morhouse, Mrs. O. A.; Astoria, N. Y.; Strand.
Murphy, Mr.; Chicago, Ill.; Traymore.
Mathews, G. C.; Madison, Wis.; Haddon Hall.
Maull, W. R.; Philadelphia, Pa.; Brighton.
McDougall, Miss I.; Hamilton, Ont.; Stanton.
Messenger, J. A.; Philadelphia, Pa.; Marlborough-Blenheim.
Morrison, A.; Philadelphia, Pa.; Traymore.
Morrison, Mrs. A. H.; Philadelphia, Pa.; Traymore.
Morrison, Miss E.; Philadelphia, Pa.; Traymore.
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N

Newshas, Bob; Atlantic City.

O

Olwine, Mrs. H.; Cohoes, N. Y.; Traymore.

P

Patterson, Mrs. R. H.; North Adams, Mass.; Traymore.
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Price, Wm. K.; Havana, Cuba; Traymore.
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Pettengill, Russell A.; Chicago, Ill.; Traymore.
Pratt, Mrs. Edw. G.; Boone, Iowa; Ambassador.

Q

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R

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Ranier, Mrs. J. F.; Memphis, Tenn.; Traymore.
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Reegan, W.; Traymore.
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Roberson, Mrs. J. C.; New Brunswick, N. J.; Haddon Hall.
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S

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Stengel, A. F.; Haddon Hall.
Stiles, Mrs. G. W.; Portland, Me.; Haddon Hall.
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Shattuck, Miss Alice; Traymore.
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Stites, Mrs.; Gloucester, N. J.; Traymore.
Stites, Miss; Gloucester, N. J.; Traymore.
Swain, Mrs.; Ossining, N. Y.; Dennis.
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Stoecker, Mrs. Louis; Newark, N. J.; Shelburne.

T

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Taylor, Marie V.; Lawrence, Mass.; Traymore.
Tenney, Mrs. A. B.; Boston, Mass.; Traymore.
Terry, Mrs. Merritt; Niagara Falls, N. Y.; Dennis.
Tappin, Philip; Atlantic City.
Tassell, Mrs. A. L.; Chicago, Ill.; Traymore.
Taussig, Mrs.; Philadelphia, Pa.; Traymore.
Taussig, Miss Ellen; Philadelphia, Pa.; Traymore.
Tenney, Charles E.; Newton, Iowa; Ambassador.
Tinnerman, A. H.; Cleveland, Ohio; Ambassador.
Thurber, J. W.; Cleveland, Ohio; Traymore.
Travis, Mrs.; New York City; Haddon Hall.
Travis, Mrs. G. W. L. R.; New York City; Haddon Hall.

U

Uhlig, Mrs. E. C.; Brooklyn, N. Y.; Strand.

V

Vincent, Mrs. G.; New York City; Chalfonte.

W

Wagenheimer, M.; Atlantic City, N. J.
Ware, Mrs. L. H.; Martinsburg, W. Va.; Asbury Ave. Ocean City.
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Wilson, Mrs. L. B.; Baltimore, Md.; Dennis.
Wilson, Master Burton; Baltimore, Md.; Dennis.
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Wurth, W.; Chicago, Ill.; Shelburne.
Watson, Mrs. H. E. G.; Toronto, Can.; Haddon Hall.
Weil, S. J.; Mt. Vernon, N. Y.

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American Gas Journal

SIXTY-THIRD YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.

Daily Edition, published in Atlantic City. October 24, 25, 26 and 27, 1922.

ELBERT P. CALLENDER, Pres. S. G. KRAKE, Vice-Pres.-Treas. A. M. GLEASON, Sec'y.

WALTER A. FAIRSERVIS, Editor

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Editorial Offices: Atlantic City, Chalfonte Hotel. Telephone 4444, Extension 54.

Technical Men Discuss Meter and Main Deposits.

R. L. Brown Makes Report for Committee.

One of the principal features of the meeting of the Technical Section, held yesterday in Convention Hall, Ocean End of Steel Pier, was the report of the Committee on Deposits in Gas Pipes and Meters, through the Chairman, R. L. Brown, of the Bureau of Mines, Pittsburgh, Pa.

The report represented the work done by this Committee during the past year. During that time the Committee gave its entire attention to a study of the gummy and resinous deposits occurring in many meters. The report was called a progress report only, and it was pointed out that it contained much that might be considered tentative and based on a limited amount of experience. The various factors that promote the formation of gummy and resinous deposits in gas meters and pipes were described. The gas industry was warned again against an excess of lead in a meter and its solder, for lead is very active as a catalytic agent in promoting the formation of these deposits. The importance of the amount of oxygen in the gas was emphasized. A table showing tests made in 23 different gas plants was presented. The report follows in part.

THE METER TROUBLE AND THE PROBLEM IT PRESENTS

Occurrence

In many gas systems there are being deposited or formed in the small mains, service pipes, and meters, slight or much more serious quantities of gummy or resinous material. The deposition dates back rather generally to about 1917. It is not confined to plants that scrubbed for "light oil" during the war, and it is not always present in the meters of those plants whose gas was scrubbed. Within the writer's experience, the difficulty is to be found where the gas distributed is, in part, at least carbureted water gas. It occurs in systems in which distribution is effected under all pressures from a few inches of water up to 40 lbs. This deposition is not confined to any one section of the country, but is somewhat localized.

The trouble resulting from this deposition is caused by its accumulation in the valve chambers, faces, and seats, on the walls and bottoms of the lower spaces of the consumer's meter. Perhaps the most serious manifestation is the accumulation of this gummy material on and in the leather diaphragms of the meters. It cannot be removed and the leather becomes hard and brittle and cracks, following contact with the air as when opened for repair. In many instances destruction of the fibre and disintegration of parts of the diaphragm have taken place. Particularly is this true in dipping diaphragm meters. To a lesser extent, difficulty is encountered in those systems in which compression and high pressures are employed in the distribution of gas, in the sticking of regulators or governors by gummy deposits even many miles from the generating stations.

Costs to Industry

In those systems most troubled, the meters that must each year be rebuilt and fitted with new diaphragms because of gummy deposits may be greater in number by 100 per cent than a normal yearly removal prior to the appearance of the gum. In the aggregate several hundred thousand meters must be rebuilt each year because of this gum deposition. The annual cost to the industry in actual outlay for repairs, inspection, and complaint service, in unpaid-for gas, to say nothing of inconvenience to company and consumer alike, amounts to several million dollars.

Analysis of the Problem

The fact that this deposition of the gummy or resinous material (hereinafter called gums) has developed into a serious difficulty within the last few years brings into the problem many possible factors. The situation in many plants has been complicated by those conditions, so extremely difficult from an operating standpoint, which obtained during the war and post-war period. However, it was recognized at the outset that the basis of the deposits was to be found in the unsaturated hydrocarbons occurring in the gas. A general analysis of the problem indicated that one or both of two factors were now operating to produce the gum being deposited. These were considered to be: (1) More polymerizable or gum-forming material is being passed into distribution lines and into consumers' meters, either by reason of its greater production or by a less complete removal of that material. (2) More factors are functioning to cause polymerization and gum formation in the distributing systems. These factors are large in possible number, and may be chemical or physical in nature. The variables to be encountered in determining the measure of either of the two above causes are great in number and to a marked extent, interdependent.

Chemical Study

The chemical study has had for its purpose the providing of a knowledge of (1) the gum, (2) the gum-forming constituents of the gas, (3) the mechanism of gum formation and deposition, (4) the chemical conditions necessary for gum formation, and (5) the other chemical phases proving themselves requisite ones.

THE PLANT AND METER SURVEY

Meters

The purpose of the meter survey was to observe in detail the variations in amount, character, and manner of gum deposition in meters of different systems. It was also desirable to obtain the experience and opinion of those individuals who had the gum to deal with practically.

The plan adopted was to attempt to correlate the

chemical results with operating conditions in a number of plants having gum troubles and those not having them. Here the condition of short life meters would in general represent the result of the operation at that period. This second plan carried out in a rapid and qualitative way, has proved fruitful in very many ways.

Attention Given to Carbureted Water Gas

The work so far has been largely confined to systems and to materials from systems distributing carbureted water gas, or water gas mixed with less than 50 per cent of coal gas. This was done because, within the writer's experience, no system distributing coal gas has shown any serious trouble due to gum.

Rather widely collected information has confirmed that view and borne out tentative theory on the point. Typical coal gas gives little or no drip oil and little oil condensate in meters (dipping meters excepted). If that be true, then two important deductions may be drawn—(1) serious gum troubles in general do not exist where there is no collection of gas condensate. This seems particularly true of meters. (2) That the gum-forming reactions that do occur in the gaseous phase, alone are not sufficient to give rise to serious gum troubles in meters. An inspection of many meters from many gum-troubled systems seems in general to confirm these statements. The fact that the gum trouble in meters is cyclic and seasonal, and also a function of temperature and gas "sendout," indicated that the natural oily condensate in the meters was contributing in a very material way to the formation of gum. It was for this reason that in a more general investigation of the gum-forming constituents in manufactured gas, attention was first centered on the natural condensate as drained from meters and as taken from the drip pots in outlying parts of distribution systems.

[It was stated that inasmuch as all drip oils contained oxygen, the subject was investigated from the standpoint of autooxidation of the hydrocarbons.]

RESULTS—CHEMICAL STUDY

Gum and Gum-Forming Constituents

Due to its inherent chemical and physical characteristics, the gum has been worked on, only as the need for correlating data arose. From observation of meter shop methods of using boiling alkali to cleanse meters of their gum, it was judged that the gum must be largely acidic in nature. This was found to be the case and salts of the alkali, alkaline-earth and heavy metals have been prepared. In physical appearance, they are all gummy or gelatinous and not unlike the gum itself. This explains the fact that in meter gums there is nearly always a mineral ash, largely iron-oxide, but often other metals are present.

Drip Oil and Meter Condensate

The drip oil as selected* and the meter drainings were alike save for the diaphragm oil and usually larger quantities of gum contained in solution in the latter. Samples from a dozen different systems were examined. The drip oils were very largely aromatic in character. Their specific gravities at 20 degrees varied between .880, the approximate specific gravity of crude light oils and 1.000, depending largely on the amount of gum in solution. Free from gum, these oils ran from about 0.87 to 0.90 at 20 degrees C. The total unsaturation varied from 30 to 50 per cent by weight of the sample after being separated from the gum in solution. The gum present represented from 1 per cent to 25 per cent of the original samples, and that value must be added to the respective figures for unsaturation. The unsaturated hydrocarbons so far identified and measured account for all but a very small amount of the total unsaturation of the drip oil. The unsaturated hydrocarbons indene and styrene constitute the great part of those present. In the sample being completely investigated no cumarone has been detected. If present the quantities are small. A priori reasons render its presence doubtful.

* Taken at a point in the distribution system such that it represented that which would be condensed in the meters nearby, given a proper temperature differential.

INDENE AND STYRENE

[The author described some properties of indene and styrene.]

It is thus seen that these two materials may give rise to gum and trouble in meters. They do not, however, close the list, there being others in condensate and gas that by reason of their chemical properties one dare not disregard in a complete investigation. Next in order is a consideration of the evidence indicating that these two compounds do form gum in gas distribution systems.

(1) The meter gums taken from systems having trouble have been made to yield both indene and styrene in quantity after they had been freed absolutely of all oils. These oils themselves contained relatively large quantities of both compounds.

(2) The meter and drip oil gum analyzed showed a carbon-hydrogen relationship comparable to that of gums formed from indene and styrene, notwithstanding considerable and varying portions of sulphur and oxygen present.

(3) Samples of drip oil both in distribution systems and in the laboratory have shown with time increasing amounts of gum, i. e., polymerization plus autooxidation products, and a reciprocal decrease in the amount of the styrene and particularly the indene present.

While catalytic influences are to some degree at play in meter gum formation, they have been regarded in this investigation as secondary factors rather than primary. The limited time and assistance available has not permitted this phase to be given much attention. However, there are certain facts that should be stated at this point. The writer has observed in a great many gummy meters that the solder seams and joints, especially those blackened, are apparently spots where gum formation has begun (in short life meters) and where it is proceeding most rapidly. This is undoubtedly due basicly to the lead, its oxide, or perhaps other salts. The gas industry has been warned throughout many years against an excess of Pb in a meter and in its solder. The development of an acidic condition by the condensate in a meter should soon give rise to "resinates" and gum and resin formation. Our study

has led us to believe that this is actually the case. Whatever metals may be playing a catalytic influence, those metals have been in most all places a constant factor for many years, and it is of greater interest to turn to the oxygen and its source.

Gum-Forming Factors

Oxygen and its Source. The effects of oxygen in the gas distribution system has been stated. The source of the oxygen is believed to be the air introduced into the gas. On the basis of the ultimate analyses reported to the committee, plants using oil with no oxygen content are having gum troubles. On the other hand, some systems reporting oxygen in the gas oil are reported as little troubled with gum. That the trend in O_2 content in carbureted water gas for the past 5 to 7 years has been upward seems to be well established. Responsible operators and executives have rather generally subscribed to this statement. Handbooks and other published works as well as such analyses as have been secured by the committee indicate that formerly the oxygen usually ran at .5 per cent or less. Today, the average oxygen figure is practically double those figures. The average of the values reported to the committee is about .8 per cent. Some recent literature has given oxygen contents of 1 per cent.

Just what does 1 per cent of oxygen mean? It means that on the basis of an average annual per meter consumption of 30,000 to 35,000 cu. ft., about 30 lbs. of oxygen left the generating plant for every meter, or roughly two lbs. of oxygen per lb. of unsaturated material destined to fall out as drip oil or several lbs. of O_2 per one lb. of meter condensate.

It is thus seen that the oxygen content of the gas is an important factor in gum formation. However, it is a single factor among a number. It is obvious that the presence in a meter of gum-forming constituents is a requisite factor. There is undoubtedly a time factor which necessitates condensation or scrubbing in the meter for serious gum trouble. In view of the general similarity of the drip oil samples obtained from systems troubled with gum and from those not troubled with it, it followed that a very probable difference in amounts of drip oil existed. Within limits this seems to be true. For evidence on this point one must turn to a consideration of the results of the plant and meter survey. It should be stated that some twenty gas plants have been visited as a preliminary general survey. The information in all instances possible has been reduced to numerical values and offers some very interesting indications as to probable factors and tends to confirm the results of the chemical study as presented in the part of this report just read. The following table presents pertinent data on three points.

I Plant	II Gum	III Average oxygen content in %	IV Drip Oils (Gals. per M.)	V Rate of Oil Input, Factor (a)	(b)	Remarks
1	much	0.8	0.3	1.7 - 2.5	0.6 - 0.9	High standard gas
2	none	0.4 - 0.5	0.02	1.3	0.5	
3	none	0.5	0.02	1.2	0.5	
4	bad	1.0	8% of oil			Pintsch
5	bad	No analysis ¼% air reported	considerable	1.5 - 1.6	0.6	Some compression, O_2 high; Other factors entering
6	some	No analysis ½% air reported	considerable			Other factors entering
7	much	1.2	0 26	2.4 - 3.1	1.1 - 1.5	
8	slight	1.0	0.21	2.0	0.95	
9	none	0.8	0.06	1.2 - 1.3	0.45	
10	much	0.8	0.10 - 0.12	2.3	0.9	Drip oil estimated
11	much	0.7	0.10 - 0.12	2.3	0.9	Drip oil estimated
12		0.8 - 0.9		2.3	0.9	
13	some		0.10 - 0.20	1.8	0.7	
14	none	0.8	low-no figures	1.0 - 1 1	0.55	
15	none	0.8	0.04	1.3 - 1.4	0.5	
16	some	1.2	some	1.4 - 1.5	0 55	Condensation in meters
17	none	1.0	low	1.4 - 2.0	0.5 - 0.75	Little oil beyond second mile of distribution
18	none	No analysis 0.6 - 0.7	little	0.7	0.45	O_2 value estimated from air input.
19	none	0.5 - 0.7	quite low	1.3 - 1.7	0.5 - 0.65	50% coal—50% c.w.g.
20	none	0.3	low	0.8	0.4 - 0.50	
21	none	0.65	low beyond 2nd mile	0.7 to 1.0	0.5 - 0.25	O_2 estimated from air input.
22	none	high	none			Coal gas
23	none	high	practically none			Coal gas

The first column is a number assigned to the plant referred to. The second column indicates the general state of the meters as regards gum. The third column is the reported oxygen content of the gas of that plant. The data of this column as a factor in gum formation has been discussed. However, it is of interest in view of these values to refer to the paper of O. B. Evans on "Revivification of Oxide in Situ" presented in 1919. Of the 24 water gas plants listed, 12 reported in 1919. Of the 24 water gas plants listed, 12 reported 1% or less of air input, 6 reported 1½%, and 4 reported 2%. By comparison it is again seen that the general air input must be somewhat higher than formerly.

The fourth column shows the drip oil found in the various systems. Where figures are given without other description, they represent gallons drip oil per 1,000 cu. ft. of gas sent out. On the basis of this data as reported to us, it will be seen that absence of gum troubles is associated with low drip oil figures. On the other hand, gum trouble is invariably found where high drip and high oxygen are encoun-

tered. The objection will undoubtedly be raised that in times when a candle-power basis was the rule, the drip oils were high in amount, running perhaps about 10 per cent of the oil input. This is true but other considerations enter there. The character of the drip oil examined this year from plants running on a modern B.t.u. gas standard has been rather uniform and strikingly low in oils of the benzene toluene boiling range. Their amount has been in general approximately such as to indicate that their presence is the result of the solvent or scrubbing action of the heavier gas condensate which had been thrown down because the gas had been cooled below the saturation point of the gas for that heavier material. In short, the gas is being sent out from storage holders saturated with the solvent naphtha fraction of its light oil content but far from being saturated with respect to the benzene-toluene fractions. Consequently, cooling in the mains and meters brings down a drip oil largely solvent naphtha. Whether with greater oil inputs per thousand cubic feet of gas as in years past there was relatively greater amounts of light oil of the benzene-toluene fraction in the gas and consequently in the drip oil, cannot be definitely asserted in the present incomplete state of collection of data. However, such a condition is indicated by the data at hand and in general it seems very probable for a number of reasons. Such a condition would tend to prevent the condensation of the solvent naphtha fraction in meters, by reason of its being carried down and removed as drips well ahead of the meters.

In column *V* are given relative factors expressing oil input per minute with respect to the size of the set. In *Va* the values have been expressed in a simple and empirical ratio based on the diameter and in *b* on the horizontal surface of the generator. With full cognizance of the large number of factors involved in the cracking of oil in a water gas set and their interdependency, it is held to be particularly striking and evidently significant that those plants having trouble show high relative factors of oil input. Particular attention is called to the variation in the three factor columns for plants 7, 8, and 9. Those plants are using the same oils and fuels. The differences in 7 and 8 are due entirely to operation. To a limited extent other factors enter into the case of number 9. The tentative and probably correct interpretation is imperfect and incomplete cracking in the gum troubled plants which have high rates of inputs. In some cases, part of the oil escapes uncracked, as is strongly indicated by tar emulsion production. This latter has been convincingly shown by Odell, Fuels Engineer, U. S. Bureau of Mines, to be basically due to free carbon as emulsifying agent and to increase with the increase of paraffin content in the tar.

Compression.

Compression as a factor in gum production although incidental and secondary, enters seriously in at least three ways: firstly, it furnished heat to the gas; secondly, with any given O_2 content, every 15 lbs. pressure doubles in effect the O_2 content and likewise the unsaturates, and speeds up the interaction, productive of gum, enormously; thirdly, it increases condensation.

Other Factors

That gum formation within limits does result from impurities of an acidic nature present in the gas incident to generation particularly during periods of stress, is considered certain. There are other factors believed to be at play in gum formation at many plants. The present state of the investigation will not permit consideration of these at this time.

SUMMARY.

On the basis of the evidence in hand the following brief conclusions, as to primary factors in gum formation, have been drawn:

(1) The present day higher oxygen content in manufactured gas, particularly carbureted water gas, is a factor in the gum trouble in meters.

(2) The presence in meters of natural condensate which has been found to be highly unsaturated and of gum producing properties is a definite factor both directly and indirectly in gum formation.

(3) The high rates of oil input as practiced today in the generating equipment in many plants give rise to incomplete cracking of the oil and is productive of gum trouble.

Collect as They Read Meters.

Small Company Has Found This System Pays, Reports W. G. Murfit.

In some of the smaller gas companies meter readers collect the bills when they make the reading, according to a paper by W. G. Murfit presented before the Accounting Section meeting yesterday afternoon in the Auditorium of the Steel Pier. Mr. Murfit's paper was on "Consumers' Accounting in the Smaller Utility," and he discussed fully the methods that are used in companies having less than five thousand meters.

Mr. Murfit said in part:

In order to follow more closely my subject, "Consumers' Accounting in the Smaller Utility," let me first explain what is meant by the smaller utility. The Consumers' Accounting Committee issued to company members several months ago a questionnaire regarding their accounting systems. It was evident from the answers received that the most headway would be gained by separating the companies into two classes, the large ones and the small ones, as, for obvious reasons, the accounting system in the large ones differ materially from that in the small ones. The line of demarcation was arbitrarily set at five thousand meters.

In discussing the small companies' accounting, I shall divide the subject into gas, merchandise, and

sundry charges. Sundry charges are to include maintenance work and such other miscellaneous services charged for, as may be determined by the management or allowed by the rate schedules and regulations.

Gas Accounting

Only sixteen per cent of the companies returning questionnaires are using bound ledgers; and from their replies it is evident that even this percentage will be reduced in the near future. The largest number are using loose-leaf ledgers, with card ledgers ranking second. The bound ledgers are being abandoned for self-evident reasons.

To my mind there is but little choice between the loose-leaf ledger and the card ledger. In either one, the prime objections to the bound ledger are overcome. Inserts and removals of pages can not be quite as readily done in the loose-leaf books as in the card ledger. On the other hand, there is some slight chance of cards being lost when removed for inspection, or else not being refiled properly. Possibly the cost extension back binders for loose-leaf pages are more expensive than the card index systems and the filing cabinets for cards. To offset this, the loose-leaf ledgers occupy less space. One advantage of the cards is that two or more persons can work on accounts at the same time.

In most companies the procedure is as follows:—The prospective customer signs an application for gas whereon is printed the usual rules of the company. In a few cases the application merely states that the customer applies for gas and is willing to be bound by the rules of the company as on file in the office, and approved by the Public Service Commission. This latter makes a more flexible application. The clerk writes up the work order, usually in duplicate. This work order may have been designed for meter work only or may be a form which is used also in merchandise work. The work orders are numbered serially as issued, and the work order number is placed on the application. These applications are then filed away alphabetically.

The work order is usually printed in duplicate, or in triplicate in the largest of the small companies. One copy remains in the office and the other is given to the fitter to do the work. He sets the meter, turns on the gas, obtains any meter deposit not previously collected and gives a receipt therefor, and lists any material that may have been used on the job. The meter order, i. e., the work order, is returned to the office and a ledger page or card opened in the consumer's name. The completed meter order is then filed in order of date of completion. It is at this point that the addressograph plate should be made, though sometimes the plate is made before the meter order goes on the street. Thus, the meter order is addressographed as is also the blank gas ledger page. If meters are read from meter reading books a page for that is also made out at this time.

Some companies do not have a meter reading book, using instead the gas bill itself. This gas bill is printed with one or two coupons attached. These are first addressographed, the addressograph plates being in the order in which the names appear in the gas ledger. The previous index and date is placed on the bill and coupons and any outstanding balance, either gas or merchandise, is included also. They are then given to the meter reader to take on the street. The meter reader reads the meter, makes the subtraction, obtains the charges from a prepared schedule he has in his hand for each unit hundred of feet,—thereby avoiding any calculation on his part, and leaves the bill on the premises. He writes all data on both the bill and the coupon, and in a few cases he attempts to collect at the same time. I know of one company in which seventy per cent of its revenue is obtained by the collector when he reads the meter; and the consumers in the territory would not have the plan abandoned.

This situation I have in mind covers a number of small towns and intervening territory, and is so scattered that consumers may not pass one of the three district offices during the month. The method of collecting when reading meters saves them the necessity of mailing in check, or purchasing a money order, or running the risk of forwarding the cash. One distinct advantage of the plan is that a high bill complaint is nipped in the bud, for if the bill seems unreasonably high, the meter reader can at once recheck the reading and can discuss with the consumer the reasons why the consumption is so much greater than was expected. If collections are effected by the meter reader, he receipts the bill and returns the coupon marked "Paid" to the office.

In event collection is not effected, he merely leaves the bill and returns the coupon to the office. Where the two coupon system is used one coupon remains with the consumer to be detached by him when forwarding payment, thus avoiding the necessity of the company acknowledging receipt.

When meter reading books are used the meter reader usually records only the date read, meter index and his initials. Spaces are usually allowed for a year or two of readings and, if the company is large enough, it is customary to shift readers from one territory to another so as to avoid any possibility of faked readings. Usually this is not possible in the smallest companies, as they have only one reader. The new index is posted to the customer's ledger with value, service charge, etc. Some companies show the consumption also on the meter reader's page, subtractions being made by a machine of one of the various types. Rubber stamps for each of the hundreds of consumption are arranged in order, the stamps showing the footage, gross value, any discounts, and net amount. Thus, if the consumer uses twenty-six hundred feet you pick up the twenty-sixth stamp and make an impression on the meter reading page, on the customer's bill, on the coupon and on the gas ledger. This saves time and eliminates chance of error. When the posting of the meter book is completed, the machine will show the accumulation of footage and of gross sales, of discount and of net, according to the capacity of the machine. This method reduces considerably the amount of work that normally would accumulate at the end of the month.

A number of companies have adopted a post card which is left at the consumer's premises in event entrance thereto can not be obtained. This is a prepaid return card on the back of which is a skeleton set of dials. The consumer is advised that the meter

reader called and could not get in; and she is requested to indicate the position of the dials thereon and return it to the company. This is a point of service appreciated by customers, as it prevents an accumulation of two months' actual bill or submitting an estimated bill. Likewise, it shows the customer there is no hocus pocus in reading a gas meter and tends to increase their confidence in the honesty of the instrument. In many cases where meter reading books are used and bills are not left at premises when the meter is read, these bills are mailed or delivered by the company. There seems to be an increasing tendency on the part of small companies to attempt to collect at this point. Others merely deliver the bills and collect only when the consumer insists.

I have noticed on two or three questionnaires that companies have not inserted the meter reading or meter index on customer's bill. They believe that the customer is interested only in the amount of dollars and cents he has to pay and not in exactly how the company arrived at the figure submitted. We think this should be discouraged. We believe consumers should be encouraged to read their meters, so that they may be familiar with the amount of bills expected, have the money ready, and can then make any inquiry that they wish. In fact, it may be a worth-while suggestion to have two sets of blank dials shown on the bill itself and the position of the hands indicating the index shown thereon, when the bill is submitted to the customer.

In event the bills are collected when meters are read, or when bills are being delivered, a detailed cash sheet is made out by the meter reader, showing money collected; and from this the entries are posted by the bookkeeper to the ledger. A receipt showing the total money turned in should be given to the meter reader by the office in such cases.

The company I previously referred to as supplying a scattered territory, maintains no office nor has a permanent fitter in one of the towns it serves. Nevertheless, bills which are not paid to the meter reader may be paid at the local national bank, which is authorized to give receipts. The company's detail cash book is in loose-leaf form and a supply of these loose-leaves is kept by the bank. As payments are made by the consumers, the bank lists the receipts on one of these cash book pages and once a week forwards the page, duly receipted, and serving therefore as a deposit slip, to the home office of the company. The total of the loose-leaf cash pages is posted to the general cash book of the company and at the end of the month the summary of the cash posted to the gas ledgers, as obtained from the adding machine tape, should be the total of the gas receipts in the general cash book of the company.

Those companies granting discounts for prompt payment or inflicting penalties for delinquency must issue delinquent notices on the proper dates. If the territory warrants, and continuous reading is employed, these discount dates occur on successive days. At such times overdue notices are issued calling attention to the fact that unless account is paid service is liable to suspension. Companies having no discount or penalty system usually call the consumer's attention to the non-payment when the next bill is rendered, and the collector is instructed to obtain cash or advise the office that payment for the two months has not been paid, and the delinquency notice is thereupon mailed the consumer. Usually but three days is allowed between the mailing of the shut-off notice and the issuance of the order to the fitter to obtain payment or shut off the gas.

I found that the systems are practically uniform in the method of handling prepay meter collections.

Merchandise Accounting

Like the gas accounting, merchandise accounting in the small company is accomplished by the use of but few forms. The order for appliances sold on the installment plan is usually taken on a form of Lease Blank. This blank varies according to the states and as dictated by respective state laws. The purpose of it is to retain the title to the appliance until the consumer has completed payments in full. In several cases the work order is a carbon copy of this original signed sales slip, but in most cases separate work order is made out. As stated before under gas accounting, this order may and may not be in the same form as is used to set a meter. Preferably it should not be, as the data to be returned to the office is radically different in the case of merchandise orders. These work orders should be at least in duplicate, one copy remaining in the office and the other going on the street. They are numbered serially as issued; and there should be a space on the work order for the classification showing to what account the labor and material should be charged; this being the account to which the sale is credited. When this work order is completed, it is returned to the office, where the duplicate is destroyed, or checked off to show that the work has been completed, or is used to account for material.

The various material that has been used is taken off against the various accounts and at the end of the month priced at storeroom cost, so that accounts on which the work was done may receive the proper charge of storeroom supplies issued. The selling prices are daily entered into a columnar Sales Book, the monthly totals of which will show, on one side, a sum to be charged against the controlling account, "Merchandise Accounts Receivable" and on the other side the various sales profit and loss accounts. If the work is of such a nature as not to be charged against the customer, then nothing further need be done to the order; but if the customer is to be charged then bill is made out and sent. The work order is given a bill number, and the customer's merchandise ledger card posted with the amount of the bill. Inasmuch, as full details of the work are on the work order, and furthermore as these work orders when completed are filed in the order of the bill number, it is only necessary to post the bill number to the customer's ledger card in order to assure ready reference in case of inquiry. In other words, the work order has first an issue number and finally a completion number. The completion number or bill number is necessary because the work is not completed in the same sequence in which the orders are issued. Such being the case it is not necessary to transfer the details of the work to the customer's ledger card

A mere reference to the bill number on this ledger card will enable the bookkeeper to obtain full details in event of inquiry.

Some companies instead of having a consumer's ledger card merely make a carbon of the customer's bill and file that in a loose-leaf binder alphabetically. As the accounts are paid these pages are removed. It is my opinion that the ledger card system is better because it affords a ready and single reference to the consumer's credit history. There is a measurable stationery saving, and it is easier to include merchandise balances on gas bills by this method.

It is commonly believed that there is an advantage in showing merchandise balances on gas bills, but there may be some awkwardness in collecting the data to do this. The gas bills are continuous though fluctuating from month to month according to consumption and payments on account. There may and there may not be any merchandise balance at all. Probably not more than fifteen or twenty per cent of consumers have a merchandise balance on the company books. If both merchandise and gas accounts are filed alphabetically it is not difficult to tie the two together; but if the gas accounts are filed geographically and the merchandise accounts alphabetically, the best way to do is to put the page number of the gas account on the top of the merchandise ledger card. Then after the gas bills are made out, post the merchandise balances from the merchandise cards to the gas bills. Some companies using a card ledger system for merchandise and for gas accounts, have adopted cards the same size but distinctive colors. The live merchandise card is filed back of the gas card, so that any balances are readily picked up when making out the gas bill. The dead cards are all filed separately and alphabetically as usual. The disadvantage of this is that posting to the live merchandise ledger cards must be made with the aid of an index. Also when the merchandise cards are balanced with the controlling account, it is necessary to manipulate the gas cards; and vice versa when balancing the gas cards. One company has overcome this difficulty by maintaining but one controlling account, so that Merchandise Accounts Receivable and Gas Accounts Receivable are included with each other.

It is impossible from the data I have received to determine just how many accounts should be handled by a clerk. This is because a clerk's duties do not consist only of ledger work in the small company. Roughly it seems as though one clerk should handle at least one thousand accounts. That is to say, a company with two thousand meters should require not more than two clerks, who will make out the bills, post both merchandise and gas ledgers, post cash, make out bank deposits, make out work orders, receive complaints verbally or on the phone, answer letters, and sell on the floor. Amongst small companies having less than one thousand meters, it sometimes is good policy to assign to the office clerk such clerical work as would ordinarily be done by the fitter. This is because the office clerk may have time to spare whereas the fitter may not and it would be true economy to re-arrange the work.

Small companies of one thousand meters operating in one town can practice economies in accounting and labor which would be impracticable in a company of one thousand meters covering two towns. Small companies which are a part of a large holding company combination must perforce have an accounting system to tie in with the home office. This is escaped by companies owned locally.

There is one phase of consumers' accounting which I have not yet touched upon and that is bookkeeping without books. I know that there was but one company with less than five thousand meters which reported this system in effect. The idea is a new one and the reluctance of managers to change is but the natural outgrowth of many years dependence on books of permanent entry. Bookkeeping without books can best be understood probably by those companies who do not use a merchandise ledger, but whose outstanding merchandise accounts are evidenced by carbon copies of the customer's invoice. Bookkeeping without books is merely this principle applied to gas consumer's accounts.

Under this plan the meter reader's book shows merely the date, index, a space for consumption and the meter reader's initials. He fills in, at the premises, all but the space for consumption, and that is figured in the office the next morning. A typist using a combination calculating machine and typewriter then writes out the bills, the machine making the deduction in cubic feet. The footage is carried along in the machine so that meter routes can be totaled. Another clerk using rubber charge stamps for the various quantities of consumption, stamps the bill and the two coupons attached. Any unpaid balance from the previous file of coupons is now added and the bill and one coupon is mailed to the customer. The customer's coupon is returned with the payment and stamped "Paid" in the office, with the date thereon. At the expiration of the discount period of that route, all the paid coupons of that route are placed in order and matched against the office coupons which have been retained. These office coupons, now evidently paid, are pulled, so that there remains in the file only those coupons which accounts have not been discounted. Delinquent notices are sent on these and any still unpaid at the end of the month are transcribed on the following month's bills and coupons. The advocates of this system say that it has all the advantages and none of the disadvantages of bookkeeping with books but that in addition the closing of the books is spread over the entire month, and there is great economy in labor and stationery.

The addressograph serves as a check against malicious or accidental removal of pages from the meter reader's book, and assures the company of a record of every meter that was put in service. The discount dates expiring continuously through the month enable the books to be closed as those discount dates arrive and when the outstanding accounts are lowest, and relieves congestion of work at the end of the month. Customers inquiring as to comparative consumption of previous years can be answered by reference to the meter reading books. And if a meter reader's page is destroyed, a duplicate can be made up by reference to the coupons on file, the key to which is furnished by the index number on the addressograph plate.

Gas Distribution Problems

Developments of the Doherty Ideal System Outlined by R. C. Griswold.

The several methods of gas distribution now in use were discussed by R. G. Griswold, of Henry L. Doherty and Company, with special reference to the latter concern's "Ideal Distribution System" first employed in Madison, Wis., in the late nineties and progressively improved in subsequent installations. The improvements were notably in the direction of longer extensions of line, thereby increasing the profitable area that could be covered while reducing the cost of service, thus permitting either greater profits on certain classes of business or the ability to get business which otherwise might be just out of reach on account of competition.

The cheaper form of distribution, said Mr. Griswold, also reduces the amount of investment required for a given amount of business done, which is a desirable condition to bring about. It should be distinctly understood that the ideal distribution system is not necessarily 2 inch pipe. As a matter of fact, the original figures made indicated that there would be some economy in using even smaller pipe than 2 inch. The principal consideration is not that the pipe shall be small, but that it shall be cheap per foot. This, of course, is not the only consideration, because usually if one part of a system of any kind is made cheaper and cheaper, some other part must have more money spent on it in order to give equivalent results.

Working of Thompson's Law

Sir William Thompson (afterward Lord Kelvin) attacked the problem of electric transmission and found that the interest on the money invested in copper decreased as the wire was made smaller and smaller, but at the same time the power wasted in resistance increased, and that the sum of these two variable costs was a minimum when they equalled each other, or as he expressed it—"The most economical area of conductor will be that for which the annual interest on capital outlay equals the annual cost of energy wasted." This is known as "Thompson's Law." As he stated it, it is not applicable to our problem, and as a matter of fact is seldom applicable to electrical engineering, but the idea of varying the conditions until the combination of all costs is the minimum can be applied to gas distribution.

In applying this idea to gas distribution, the following three laws were laid down:

1st. For greatest economy the cost of distributing mains per lineal foot should be as low as possible, other things being equal.

2nd. Since conductivity costs more in small pipes than in large ones, the pressure drops per foot should be more in the distributing mains than in the feeder and transmission mains. The transmission and feeder mains should be as few in number as possible.

3rd. Since conductivity costs less in one pipe than in more than one, transmission and feeder mains should be used as distributing mains on the streets passed through by them.

In the following discussion you will note that 2 inch steel pipe works out the cheapest for the majority of distribution systems. If, however, some other form of conduit cheaper per unit of capacity than 2 inch pipe could be found, it would of course have the advantage. Some of the cheaper forms of pipe suggested are tile, paper, compressed wood, etc. Certain difficulties peculiar to any new material occur in connection with each of these substitute pipe materials and have not been solved, principally because no earnest effort has been made to solve them. The future, however, may bring some active work on these problems which would give a solution making available still cheaper distribution systems.

No pressure regulators need be considered. It was originally anticipated that they would have to be used, but in the case of Denver, at least, the central part of the distribution most adjacent to the gas works was already piped with 4 and 6 inch cast iron pipe when the policy of laying smaller mains was first adopted. Therefore the extensions of small mains were in the outlying districts, and as the load increased and a greater and greater pressure was used at the plant, the excessive pressure fell not on the small mains but on the old cast iron system. When these pressures seemed to interfere with good service individual service governors were put on to those customers suffering from the highest pressure. After following this policy for about ten years there is still a considerable proportion of the distribution area not supplied with service governors, and this area is almost entirely piped with 2 inch mains.

Denver has found by experience that from time to time mains had to be enlarged in order to reduce excessive drop in pressure, but this excessive drop in pressure has always been found in the mains larger than the minimum size adopted there.

In making a comparison of different designs of Distribution Systems it is necessary that they be on a strictly comparative basis. It is important that the costs be at least reasonably accurate, but more important that they be relatively accurate.

Costs of Different Sizes

Table I shows the costs of different sizes of main which will be used in this report. These costs are based on actual costs of mains. Each actual main laying job has certain conditions peculiar to it.

TABLE I

Size Pipe—Inches		Cost per Foot—Laid
1	Steel Pipe	$.295
1¼	" "	.335
1½	" "	.398
2	" "	.429
3	" "	.697
4	Cast Iron Pipe	1.155
6	" " "	1.569
8	" " "	2.204
10	" " "	2.765
12	" " "	3.436
16	" " "	4.934
20	" " "	6.870
24	" " "	9.040
30	" " "	12.57
36	" " "	16.75
42	" " "	21.50
48	" " "	28.50

If the cost per foot is 20 per cent too high or too low it will not affect the conclusions as to which design of Distribution System is the most economical but slightly. However, if 6 inch instead of being 36 per cent more expensive than 4 inch per foot should be taken as only 16 per cent more expensive, it would very seriously affect the conclusions. The costs in Table I have been compiled with great care to take care of this particular feature.

In making a comparative analysis using different sizes of pipe it is also necessary that the capacities of different sizes of pipe have very correct relative values. This again is more important than the actual values. The formula used in this report is Unwin's Formula. Other formulae (Pole's or Spitzglass') will give substantially the same results in actual value, and identical results so far as conclusions are concerned.

There are some other relations which should be borne in mind when working on Distribution Systems. These are shown in diagram 1. According to flow formulae, 2 inch pipe 4200 ft. long will transmit 364 cubic feet of gas (specific gravity .5) per hour with a drop in pressure over its entire length of 2 inches of water column. This is the case for which formulae for the flow of gas in pipes are written.

In a Distribution System, however, the gas enters the main at one place but is discharged through services connected along its length, which are assumed to draw gas out of the main at substantially uniform rates per foot of length of main. This is shown in the second figure of diagram 1, and in this case with an initial pressure 2 inches greater than the minimum, the same 2 inch main would handle 619 feet of gas. In a great many cases the main is fed at both ends at substantially the same pressure. In this case which is the third figure in diagram 1, the same gas main can handle 1785 feet with the supply at both ends 2 inches greater than the minimum pressure at the middle. If such a main should become inadequate and require a greater supply of gas, it may also be fed at the middle point as shown in the fourth figure of diagram 1. In this case if the pressure at the three points of supply is 2 inches greater than the minimum pressure, this same 2 inch pipe can handle 5,000 feet per hour.

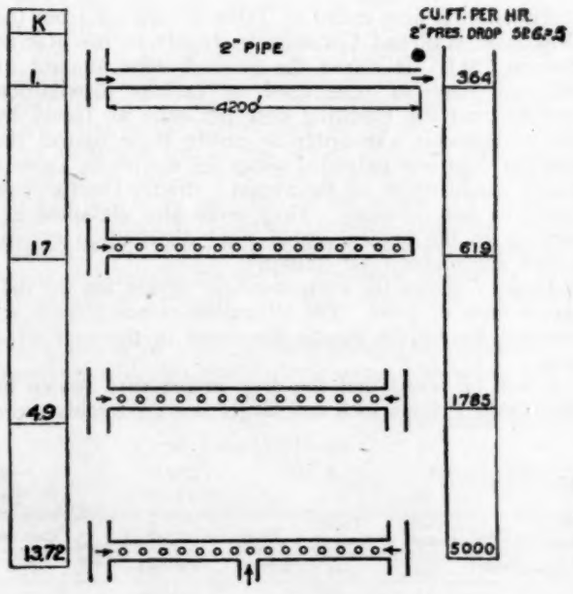

DIAGRAM 1

Maximum Demand

Before an intelligent distribution design can be made the demand which it will have to handle must be decided upon. Table II has been compiled in order to study this feature.

These companies are all manufactured gas companies except the last one (Eldorado, Kansas), which is natural gas. Natural gas in Eldorado is sold on a Two Part Rate which averages about 60c per thousand cubic feet. It is added here to indicate what might be expected when house heating becomes very general on manufactured gas systems. This particular town was selected because it has no industrial load, and therefore the figures shown represent domestic and house heating business. This town has been supplied with natural gas for many years at 25c per thousand and lavish use of gas brought about by such a rate probably still shows in the figures given in the table. Eldorado is not far from Wichita, Kansas, and competing fuels for domestic use are expensive.

It should be noted in this table that both large and small companies have been included and that the four columns at the right show very similar characteristics.

Method of Comparison

The method of making a comparison of the economy of different distribution designs is to make a design for a typical area by different schemes. In doing this the mains will be referred to under three classifications.

(a) Distribution mains are those mains whose purpose it is to deliver the gas to the successive services on the street. They are the last mains to receive gas. Usually they are laid the long way of the block because residences usually face the long side of the block.

(b) Feeder Mains. These mains are for the purpose of supplying gas to the distributing mains. They run parallel with the short side of the block and at right angles to the distributing mains.

(c) Transmission mains, the purpose of which is to deliver gas from the works to the feeder mains.

Attention is now called to Table III, which shows how one particular distribution design was analyzed. As the table shows, this distributing system consisted of 2 inch distributing mains in which a pressure drop of 2 inches was allowed between the point where the gas entered the distributing main and the minimum pressure in that distributing main. The feeder mains were selected of such size as to keep the pressure drop as near as possible to $\frac{1}{10}$ inch per thousand feet of feeder. The demand selected for this analysis was .425 cubic feet per foot of distributing main. This should be compared with next to the last column in Table II. It will

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TABLE II

	No. Customers	Annual Sales M. C. F.	Maximum Hr. Sent out (For Year) C. F.	Miles Main Actual	Annual Sales per Customer M. C. F.	Maximum Demand per Customer C. F.	Maximum Demand per Foot C. F.	Load Factor
Sedalia, Missouri	2,023	87,523.26	35,000	25.24	43	17.3	.262	.286
Danbury, Conn.	5,178	218,548.75	70,000	65.73	42	14.	.202	.356
Denver, Colo.	52,561	1,823,188.81	871,800	391.00	34.6	16.6	.422	.239
Fremont, Nebraska	1,373	75,882.88	22,000	25.81	55	16	.161	.394
Hattiesburg, Miss.	780	39,700.87	13,200	13.44	51	17	.186	.343
Knoxville, Tenn.	4,757	312,359.95	68,000	65.80	66	14.3	.196	.525
Lebanon, Pa.	1,185	97,252.94	23,000	24.32	82	19.4	.18	.482
Lincoln, Nebraska	11,977	484,782.23	147,500	125.24	40	12.3	.223	.376
Meridian, Miss.	1,539	97,659.99	23,000	29.22	63	15.	.149	.485
Montgomery, Ala.	2,997	206,493.46	53,000	51.60	69	17.7	.194	.444
Pueblo, Colo.	4,483	195,226.57	59,000	80.82	44	13.2	.14	.377
Salina, Kans.	1,714	84,864.65	25,000	24.01	49	14.6	.197	.387
Spokane, Wash.	10,277	524,884.66	113,000	140.15	51	11.	.153	.530
Chicago, Ill.	679,531	31,313,241.00	8,976,000	3,122.00	46	13.2	.544	.40
Phila., Pa.	422,671	17,774,000.00	5,796,000	1,602.00	42	13.7	.69	.35
	153,386	9,207,000.00	2,969,000	858.00	60	19.3	.67	.35
St. Louis	177,650	6,924,000.00	3,250,000	982.00	39	18.3	.63	.24
Eldorado, Kans.	2,161	276,143.00	100,000	16.00	128	49	1.26	.295

be noticed that this demand per foot is considerably greater than shown in this table with the exception of the five largest manufactured gas companies and the one natural gas company.

According to the fourth figure in diagram 1, this same rate of demand could be increased to about 1.2 by an additional feeder at the mid point, which would bring its capacity up almost large enough to handle the natural gas load. However, in Table III this has not been done. The distributing main with these limitations can be 4200 feet long and will have to handle a total of 1785 cubic feet between feeders (see column 2). Each feeder main will have to handle 1785 feet because one-half of the gas handled by the distributing main comes from each feeder and each feeder must supply half of the distributing main on each side of it at each street intersection. The feeder main size selected to do this is 6 inch (column 3).

The drop in pressure in 370 feet, (or the short side of one block) is .012 or at the rate of .035 per thousand feet. This block of 6 inch main at the cost shown in Table I is $580; the distributing main costs $1,802 or a total cost of the system as outlined up to this point is $2,382. The area supplied is 4200 ft. x 370 ft. or .056 square miles, and the equivalent cost per square mile then is $42,600. The next block adds another 1785 feet to the load on the feeder mains, and 6 inch is again selected; the drop per thousand feet now accumulates to .131 or rather more than we had allowed, the cost of the feeders up to this point is $1,160, and the cost of the distributors is $3,604. The total cost of the system at this point is $4,764, or $42,600 per square mile. In the next block it is apparent that at least 8 inch must be used for feeder mains. In this way the analysis is carried out for ten blocks. On account of the use of feeder mains larger than 6 inch the cost per square mile increases slightly, and the final figure for 10 blocks shows a cost per square mile of $48,700.

This method of analysis was followed using various sizes of distributing mains and keeping the pressure drop the same.

Cost Per Mile

Attention is now called to Table IV copied from the Wisconsin Railroad Commission report of the Racine case in 1911. It shows the proportionate amount of different sizes of pipe used in various distribution systems and the resulting cost per mile as found by the commission. In order to utilize these figures the cost per foot was extended using the figures in Table I which would make all the systems strictly comparative (next to last column). They were also classified according to the percentage of total distribution system 3 inch and under (last column).

Table V shows the corresponding figures for the different sizes of pipe. The irregularities are largely accounted for by the reason discussed in the case of 4 inch.

It will be noted that the drop in pressure shown in this Table V for 6 inch and larger is considerably more

TABLE III

	Blocks from end of Feeder	Cubic Feet Flow	Feeder Size	Pressure Drop in that Block	Total Pressure Drop	Pressure Drop per 1000 ft.	Total Length of Feeders	Total Cost of Feeders	Total Length of Distributors	Total Cost of Distributors	Total Cost of System	Cost per 1000 ft. Demand	Square Miles	Cost per Square Mile
2" distributors	1	1785	6	.012	.012	.033" per 1000' Avg. = .35" per Mile	370	$ 580	4200	$ 1802	$ 2382	$1337	.056	$42600
.425 cu.ft. Flow per	2	3570	6	.048	.060	.131	740	1160	8400	3604	4764	1337	.112	42600
ft. of distributors	3	5355	8	.025	.085	.067	1110	1975	12600	5406	7381	1377	.168	43800
2" pressure drop	4	7140	8	.044	.129	.118	1480	2790	16800	7208	9998	1398	.224	44600
in distributors	5	8925	8	.067	.196	.185	1850	3605	21000	9010	12615	1415	.280	45100
.1" pres. drop per	6	10710	10	.031	.227	.084	2220	4625	25200	10812	15437	1442	.336	46000
1000 ft. of Feeder	7	12495	10	.042	.269	.114	2590	5645	29400	12614	18259	1462	.392	46600
	8	14280	10	.055	.324	.149	2960	6865	33600	14416	21081	1476	.448	47100
	9	16065	12	.027	.351	.074	3330	7935	37800	16218	24153	1502	.504	47900
	10	17850	12	.034	.385	.091	3700	9205	42000	18020	27225	1526	.560	48700

TABLE IV.

31 Wisconsin Cities. Per Cent of Different Size Mains and Composite Cost per Mile. (Copied from Wisconsin R. R. Report Racine Case 1911.) Also showing percentage of pipe 3" and under and cost per Foot in Distribution Systems. (Based on data shown in this Report.)

Size of Pipe	1	1¼	1½	2	2½	3	4	6	8	10	12	16	20	24	Composite Cost per M. Wisconsin Report	Cost per Foot Present Prices See Table No. 1 This Report	Per Cent Distribution System 3" and Under
CITY	PER CENT OF DISTRIBUTION SYSTEM																
Appleton	.9	1.	.8	25.9		1.5	53.6	14.	2.2						$2624	$1.016	30.1
Ashland	2.2	1.8	5.7	67.1		13.1	5.0	3.4	.4	1.					1552	.561	89.9
Beaver Dam				2.3	17.9	31.3	39.4	8.3	.8						2520	.928	51.5
Beloit	1.5	.7	2.1	42.8		9.1	30.1	12.1	1.5						2157	.832	56.2
Berlin		1.	.9	65.4		18.1	14.1		.4						1634	.579	85.4
Chippewa Falls	.4	11.	8.9	47.0	1.4	18.	5.1	7.2							1620	.581	86.7
Eau Claire		7.5	2.6	24.6		33.9	26.3	1.7	1.7	.6	.5				2172	.777	68.6
Fond Du Lac				10.8		21.3	49.3	11.6		6.9					2920	1.138	32.1
Green Bay		1.2		16.6		37.4	24.9	12.9	5.	.8	1.1	.1			2622	1.000	55.2
					2½& under												
Janesville					25.	11.3	49.3	10.7	1.8	.1	1.7				2576	1.022	36.3
Kenosha				6.1			72.7	16.9		4.3					3071	1.251	6.1
LaCrosse	.8	1.	1.	28.	1.5	36.6	19.4	9.1	.6	.8	.7				2276	.818	68.9
Madison				58.3		2.4	21.6	12.7	.4	3.5	.1	1.			2254	.873	60.7
Manitowec		2.8	2.9	23.1	.2	7.2	52.3	7.3	2.4	1.8					2509	.992	36.2
Marinette				17.7		35.7	23.1	20.7	2.9						2651	.981	53.4
Menomonie	.6	.2	38.9	19.9	15.8	7.2	17.3								1561	.581	82.6
Milwaukee		.01	.03	.1		5.7	65.8	15.1	.1	7.8	3.3	1.5	.3	.3	3649	1.508	5.8
Oskosh				1.9		16.7	57.9	15.4	5.3	2.6					3094	1.222	18.6
Portage			10.9	28.		42.0	13.3	5.8							2040	.690	81.0
Racine					1.1	18.6	53.1	22.1		2.4	1.9	.8			3228	1.274	19.7
Rhinlander				28.9	23.7	20.9	18.6	6.	1.8						2033	.748	73.5
Ripon	24.6	4.5	17.5	35.8		5.1	10.4	2.1							2060	.500	87.5
Sheboygan			4.2	17.1	1.1	5.6	53.4	15.	.3	3.	.2	.2			2738	1.091	28.0
Stevens Point		8.5	6.9	15.3	2.6	13.2	49.8	3.8							2249	.863	46.5
Stoughton		7.2	1.2		56.6	14.9	14.7	3.5	1.5	.4					1812	.715	65.0
Superior			.2			11.1	33.4	27.6	8.2	6.					3234	1.302	24.8
Watertown	1.4	3.5	6.7	44.7	2.6	16.	10.	12.3	2.8	.3					1972	.738	74.9
Waukesha			3.5	3.2		11.1	50.5	15.6	5.7	.7	.5				3012	1.198	17.8
Wausau			8.2	41.2		8.4	34.5	7.							2020	.775	57.8
Wauwatosa				.6			54.3	11.9		23.1	9.8	.2			4313	1.805	.6
West Allis				10.7			54.9	16.6	9.	8.4					3318	1.372	10.7

than the 1/10 of an inch per thousand feet assumed in Table III. As a general average the maximum pressures in this table are about eighty times those shown in the previous analysis which would obtain with about nine times the flow of gas used in previous analysis. In other words, if the pressures as indicated in Table V are followed, the capacity of a system using 2 inch distributing mains would increase to about 18 cu. ft. per hour per foot of main. The original analysis using 2 inches drop in the distributing mains and 1/10 of an inch per thousand feet in the feeder mains is probably most useful to the smaller distribution systems, particularly if it is to be used for the extension of existing systems. Ultimately, however, greater economy will be realized if higher rates of flow are used even though this may necessitate the use of pressure regulators to avoid excessive pressure on the customers' service meters.

The question of leakage must always be considered in distribution design, particularly when comparing gas

TABLE V

Size	Cubic Feet per Hour Max.	Cubic Feet per Hour Min.	Pressure Drop per 1000 Feet Max.	Pressure Drop per 1000 Feet Min.
1-12	1400		23 in.	
2	4400	1400	60	6 in.
3	11000	4400	43	7
4	16000	11000	22	11
6	40000	16000	16	2½
8	66000	40000	9.5	4
10	110000	66000	8.5	3.3
12	180000	110000	9.4	3.4
16	330000	180000	7.3	2.1
20	520000	330000	5.7	2.3
24	800000	520000	5.4	2.3
30		800000		1.75

mains of two materials, such as steel and cast iron. In making certain comparisons, leakage per mile on 3" basis is a good criterion. In the present case, however, if the leakage per mile of main is 100,000 cu. ft. per year, it is immaterial whether the pipe is 3" or 6" or 12".

Table VI shows the unaccounted-for gas on a number of systems, per mile of main.

TABLE VI

City	Unaccounted For per Mi. Main. M. C. F.
Chicago	673
Philadelphia	1,109
	493
Denver	528
Lincoln	77

Actual leakage may be assumed to vary with the square root of the pressure. Since the flow of gas in the pipe also follows the same law, it is evident that increasing the differential pressure in the distribution system, should increase the actual leakage in just the same proportion as the flow capacity, making the leakage the same percentage of the gas handled as when lower differential pressures are used.

In Denver recently the leakage was running abnormally high. Two new district holders were put into service situated approximately at the edge of the old cast iron distribution system. Their use permitted a very considerable reduction in pressure over this area of the old cast iron distributing system, but from the district holders on out to the edge of the distributing system substantially the same pressure had to be carried as before. Following promptly the use of these district holders the leakage on a twelve months' basis decreased regularly.

The only conclusion that could be drawn from this

was a very substantial part of this abnormal leakage that existed was not on the steel portion of the distribution system but rather on the old cast iron system.

Practical Application

If only the theoretical figures were available to justify the use of smaller distribution mains than had previously been used, there might be some question as to whether some unforeseen difficulty would not arise. However, the Wisconsin Railway Commission's figures indicate that there are a great many places where relatively small mains have been used for a large part of the distribution system, thereby making a saving in the cost of such distribution systems of approximately fifty per cent.

The advantage of being able to make future extensions at such a considerable economy in investment is of course obvious. After the practice has been followed long enough to appreciably affect the total investment of the company, it will permit the adjustment of rates by an amount which should be able to get certain items of competitive business that are now just out of reach.

The calculations submitted indicate that 2 inch mains should be used. Local conditions, however, may vary this in individual cases and make one and one-half inch a more economical size of distributing main than two inch. It is believed, however, that very few gas companies, if any, can justify larger distributing mains than two inch, except in particular locations.

What Averages Mean

Where averages are used, it must be recognized that this average figure is only the mean between items that are greater than the average and items that are less. For example, the demand per foot may average .425. About two-thirds of the distribution system will have a demand less than the average figure, and the remaining one-third will be greater. Where the demand is greater, there are a number of methods of increasing the capacity of the original design.

First: Such locations are apt to be much nearer the source of supply than the most distant customers and therefore the supply pressure to the feeder and distributing mains is higher, permitting a larger drop in the distributing main, which would increase its capacity.

Second: An intermediate feeder main may be advisable. This would increase the capacity of a given distributing main nearly threefold.

Third: The distributing main may be replaced with a larger main from the nearest feeder.

It will be evident that the third alternative would have to be resorted to infrequently, and the total proportion of main involved would be extremely small.

When the Distribution System is properly proportioned, so that the pressures lost in different parts of the Distribution System are proportioned about as shown in Table V, the system is then in proper shape to apply greater and greater differential pressure up to the limit shown in Table V, or by an analysis similar to the one used in making Table V.

Economy of Small Mains

Planning extensions to a Distribution System, following the conclusions in this report, requires no radical change, except that extensions are made using the small distributing main found by such an analysis. The feeder mains are postponed until their need is shown by the load that develops on the extension. If the extension is to cover, for example, a real estate development district, it may be foreseen that feeder mains are necessary immediately, but ordinary extensions of a block or two are almost invariably run of the small distributing main size, waiting for future tests to show whether such mains are inadequate or not. This will sometimes result in finding that it is necessary to replace such small mains. Nevertheless this policy of using the small main, even to the extent of occasionally making a mistake in size, results in greater ultimate economy in the Distributing System than by adhering to a policy of using mains so large as to guarantee that they will never have to be replaced. By following the latter policy, almost every main would be too large, representing an enormous increase in the distribution investment.

The durability of steel mains has been questioned, but the experience of companies using them does not indicate that this is a serious factor. The mains will surely be as durable as the steel services, which has been standard construction for many years. Many things indicate that the leakage from a steel system is very much less than for a cast iron system.

Automatic Water Heater Problem Simple

Philadelphia Expert Points out Large Business Extension Possible in This Line.

Gas water heating in general and automatic water heating in particular were exhaustively discussed in a paper by C. E. Bartlett, president Bartlett & Co., Inc., Philadelphia. The interest in automatic water heating, Mr. Bartlett pointed out, has expressed itself in actual trade activity among the member companies, in many instances prior to the adoption of the recommendations of the governing bodies of the Association.

Plumbers and dealers have entered the lists most actively from coast to coast with the encouragement of their trade associations and trade extension bureau. In both the gas company and dealer fields, Mr. Bartlett states, the trade press has, with its accustomed vision, supported this new found interest with enthusiasm. He stressed the fact also that the public is awaking to this home comfort bringing appliance and is daily proving more receptive to sales effort along this line. He continued:

Such universal acceptance of a trade movement renders all the more important an examination of its origin and destination. It is quite possible to conceive of a misdirected enthusiasm which, while leading perhaps to greatly increased volume of merchandising, might lead—not to permanent benefit of gas companies—but to their

harm. To Automatic Water Heating or to any other activity of gas companies which promises to become a fundamental of the trade, should be applied a searching test to determine its ultimate result.

Gas Sales Increase

It is perfectly safe to assume a need for increased sales of gas on the part of all member companies. While an increase from the pre-war average of 25,000 cubic feet per meter to 36,000 cubic feet at present is not inconsiderable, this increase was largely in the East and, in the opinion of many, came as a result of the addition of the domestic cooking load.

It would appear, therefore, that so far as the domestic consumer is concerned, this little increase in sales of gas may be hoped for by the sale of additional cooking appliances. Where, then, is this necessary increase to come from?

Efforts to gain or even hold business in lighting have been until lately unremitting and energetic. Yet the reward has been negligible as to gain, no matter how successful as to maintaining previously existing business. It is interesting to note that the failure to obtain increased lighting business, or if it be admitted, to hold existing business, was not due in any way to inferiority of gas lighting. It is freely conceded that gas lighting in quality is better and in cost cheaper than electric lighting. The loss in lighting was largely due to the wiring of houses for electrical conveniences. The introduction of electric light and disuse of gas light was incidental. The new homes are piped for gas for fuel only despite all efforts of companies to secure piping for lighting.

Compilation of latest available statistics shows that there are in use 9,000,000 meters on manufactured gas. Of these probably 1,000,000 are commercial or industrial, leaving 8,000,000 domestic meters. There are 7,000,000 gas ranges in use. These figures lead to the inevitable conclusion that if 87% of the present meters are already serving cooking appliances, the increase in revenue to be derived from the sale of additional cooking appliances is small. An increase of gas sales from cooking is a matter of education, not merchandising, or of the introduction of other appliances into customers' homes, the present lack of which results in less than 100% use of the gas range.

Hot Water on Occasions

In many homes combination ranges and coal ranges are in use more or less constantly to provide heat for the kitchen or house in cool weather and hot water on occasions the year around. Selling gas ranges in kitchens so equipped, either as new installations or replacements, will not eliminate these undesirable auxiliaries. To get the consumer to use gas for cooking all the time these other makeshifts must be displaced.

It may be fairly assumed, also, that the sales effort of placing gas ranges in present non-users' homes has reached a point of diminishing returns. The small percentage of consumers who have not bought ranges are, to use a mining expression, not "Pay Ore." To sell them requires more effort and expense than their consumption would be worth. The few remaining non-consumers will be secured for cooking upon their application for service.

The merchandising of cooking appliances will always, doubtless, have a justly prominent place in sales department activities, but if it be true that 75% of the present sales of ranges are replacements, it would be viewed purely as merchandising and not as a promotion effort.

The field of house heating is ever recurring more and more frequently before the eyes of ambitious sales departments and possibly never before has it persisted for such a long time as at present with the advancing prices of coal and the difficulty of obtaining it. A little calculation will readily show even the most enthusiastic the apparent futility of hoping to obtain any considerable part of this business at present rates except those parts of the country where little heat is required. There is a field here, of course, in certain classes of buildings where space is at a premium, or where heat is required for short periods or where an offset credit for labor can be figured, but in general domestic use there is a long way to travel, beset with many difficulties, before universal heating by gas may be hoped for or even anticipated with pleasure by most gas companies.

As to Auxiliary Heating

Auxiliary heating may be expected to increase in the future very rapidly as the development of attractive units for this work and the general desire or necessity on the part of the public to conserve coal for the heavy duty months will put and is putting auxiliary heating appliances on the mains at a rapid rate.

The companion appliance to cooking facilities is unquestionably the water heater. Since man emerged from savagery and from eating his food raw, hot water has been a constant household need for many purposes, the number of these purposes increasing as man rose higher in the scale of civilization. Here then is a universal need. What has gas done to fill it? Domestic meters in use 8,000,000, water heaters in use 1,230,000, and that includes all types of gas water heaters, circulating and automatic.

Incredible as they may seem, those figures are substantially correct. If that be true, here is a field that promises to answer the question of, "Where is the increase in gas sales to be derived?"

If, as has been stated, the lighting load already is as great as may be hoped for, the cooking send-out largely dependent for increase upon greater use of existing or similar units, the house-heating consumption to be secured only at a seemingly impossible low rate coupled with vast capital expenditure, then if we omit industrial send-out as apart from the purpose of this inquiry there remains only the water heating field in which any great promise of increasing gas sales is held out through the active selling of appliances at this time, presenting, as it does, in addition to a great consumption, a vastly undersold market, a universal demand and an increased efficiency in the use of capital already invested. Water heating would, indeed, seem to offer the one great field for development.

Therefore, if water heating is to become a major activity of gas merchandising as an addition to an already existing structure, would it not be well to examine the existing structure first before adding to

it? And let it be said now to those who may hold that water heating is an old and not a new thing, that if it be old, its growth, as evidenced by sales either of appliances or gas, has not been sufficient to justify any belief that the previous extent of its recognition could be classed as that due to a fundamental activity.

Analysis of Gas Consumption

Three compilations of data as to consumers and consumptions, all sufficiently reliable to warrant confidence in their accuracy, are presented as analyses of gas consumption. Of these but one is presented here, that furnished by the American Gas Association. The others are shown in an Appendix.

Monthly Consumption	Consumers
Less than 1000 Cubic Feet	35%
1001 to 2000 Cubic Feet	30%
2001 to 3000 Cubic Feet	20%
3001 to 5000 Cubic Feet	2½%
Over 7500 Cubic Feet	2½%

A mere reading of these figures should startle the thoughtful into immediate action. The instant, and to some no doubt surprising, realization that 85% of consumers use less than 3000 cubic feet per month brings the inevitable conclusion that after 100 years of existence gas is still unsold to the public, notwithstanding the number of appliances that are in use.

The consumers using less than 1000 cubic feet per month are those who use gas for cooking only to a limited degree. Included in this class also are office buildings and other buildings using gas for emergency lighting, apartments where most of the cooking is done at the delicatessen stores and the usual run of occasional consumers. This group accounts for 35 per cent of the consumers.

In the next group containing 30 per cent of the consumers, those who use from 1000 to 20000 cubic feet per month, should probably be included those who make a fairly good seasonable use of the gas range but who rely on the coal range for cooking and heating in the winter and hot water for domestic use.

Small Cause for Satisfaction

The group of consumers using between 2000 and 3000 cubic feet of gas, 20 per cent, may be assumed to represent those who use gas exclusively or nearly so for cooking but who rely for hot water in the kitchen upon some other fuel. Possibly, a limted use of circulating water heaters takes place in this group. Certainly upon a consumption of less than 3000 cubic feet per month full use cannot be assumed of any appliance but the range and possible lighting in the smaller homes. These three groups represent 85 per cent of the total consumers. There is small cause here for satisfaction over the extent to which the public has been sold on gas.

A small group, only 10 per cent, use from 3000 to 5000 cubic feet per month and a still smaller group, but 2½ per cent, from 5000 to 7500 cubic feet per month. Yet it is this group, only 2½ per cent of the consumers, who may be said to be well sold on the advantages of gas and who utilize gas to an extent that might be reasonably expected.

The last group, 2½ per cent, using greater consumption than 7500, are undoubtedly, in the main, industrial or commercial or represent the larger residences. Of the latter the percentage is so slight as to be negligible.

The exact groupings as set forth in these tables will not, it is appreciated, fit every situation, but, with exceptions limited at a guess to 5 per cent of the total number of companies, these groupings and percentages will make a shoe which, if not an exact fit, will not be uncomfortable to any company in the membership of the American Gas Association.

In a discussion of water heating by gas from the point of view of increasing gas sales a few of the figures should be carried in mind in round numbers. The total domestic meters using manufactured gas is 8,000,000. The number of gas cooking appliances in use is 7,000,000. The ratio is 7:8. The number of water heaters in use is 1,230,000. The ratio is 1.23:8. Less than three out of every one hundred consumers use more than 5000 cubic feet per month.

Circulating Water Heater

At a mention of water heaters, or a first realization of water heating as a means of increasing gas sales, the usual thought, it is to be regretted, is the circulating water heater. It is undoubtedly this mental attitude upon the part of the industry generally that is to blame for the lack of a greater number of water heaters than are now in use. Whatever may be the merits of the circulating water heater, it is undeniable that it does not offer to a comfort-loving public the service that is sought in a hot water supply nor bring to the gas company any considerable amount of revenue.

An investigation of the automatic water heater reveals first any quantity of data on consumption. It may be put down authoritatively from many sources as averaging 42,000 cubic feet per year or 3500 cubic feet per month. This is an objective worth striving for. "Cook with Gas" was backed by millions of dollars in advertising and immeasurable energy in the hope of a reward far less.

While it is too much to hope for to secure 100 per cent of this prospect, the goal loses little of its attractiveness if lessened to a point of reasonable achievement. Assume that automatic water heaters could be sold only to those consumers who now have and use automobiles, phonographs, washing machines and summer vacations, and a field appears the like of which gas men have never seen since "Cook with Gas" was first uttered as a battle cry.

Furthermore, the average figure of consumption, besides being an objective to the company, represents a real economy to the user. By no other means can the average householder have a real hot water supply at so low a cost for fuel as with the automatic water heater. The service rendered by it removes any temptation to substitute a coal stove or appliance using any other fuel. The user of an automatic water heater is a gas customer to stay, for he has what he wants, hot water when he wants it, where he wants it and all he wants of it, at a minimum cost, and without any trouble on his part. What more could he wish in this line? Further, the coal range is per-

manently removed in many cases with increased consumption from the gas range.

Case for Conscious Pride

A gas company aggressively pushing the sale of automatic water heaters should be conscious of a pride in offering an appliance that worthily represents gas. The automatic water heater stands as an equal in the presence of the gas range, washing machine, vacuum cleaner and other household conveniences. Indeed, it stands ahead of some of them which are useless or handicapped without an adequate hot water supply.

Fortunately, the appliance to furnish automatic hot water has been developed and is ready. Automatic heaters are made by many manufacturers in such a wide variety of sizes and types that it should be easy to select the proper heater for each installation. The two general classes, instantaneous and storage, while each designed especially for certain conditions of service and demand fit the great majority of installations with equal assurance of satisfactory service. Each has a record of service covering many years during which thousands of installations have been made with records available to officials of companies whose mains supply the gas.

In spite of the availability of the records, in spite of the knowledge that these appliances have been making good for years, it must be regretfully admitted that only too many officials of gas companies are as yet unsold on the merits of the automatic water heater. In some companies it would seem that the higher officials are the hardest prospects on the sales manager's list. It is not an infrequent plaint of sales managers and salesmen that the higher officials or employees in other departments have even been known to advise other officials of the companies and their friends outside the companies against installing this appliance. No doubt these men are sincere in such advice, although it would seem that their education or loyalty is open to question. They are perhaps simply inclined to be victims of the rather prevalent superstition that automatic water heaters are expensive to operate. For the public, some forgiveness might be expected if it believed that. The sales departments themselves have tacitly allowed the public to gain the impression that automatic water heaters were for a special class of consumers.

Question of Operating Cost

To specify in advance just what the cost of operation of an automatic heater is to be is a hard task. From the figures shown, it is quite generally accepted, however, that for each person in the household 1000 feet per month may be taken as a liberal estimate in residence installations. If an allowance of fifteen gallons daily for each person is assumed as the hot water requirements and if two cubic feet to the gallon is allotted, which is generally more than enough, the estimated consumption works out to about the same figure. This cost is so trifling that it seems hardly credible until we look back at the actual figures. If it be true a comparison of articles for which as much money is carelessly spent may impress the prospective purchaser of the small cost of automatic hot water.

A man, for example, can scarcely believe that his daily hot water supply costs him less than one-half a good cigar. The wife is impressed with the fact that for the cost of one egg per person her household cares are lightened and the household's hot water problem solved. At the rate of $1.00 per thousand feet, however, such are the facts and the higher rates do not add very much, as there is a liberal margin of safety figured.

Assuming the chief competition to be the little coal fired generator, it is well to rely on statements of their manufacturers. The figures are then not open to a charge of prejudice. The usual claim by the maker of these stoves, speaking now of the smallest stoves usually have a firepot ten inches in diameter, is a consumption of one bucket of coal per day. That is the smallest consumption mentioned in the printed matter concerning them. An ordinary coal bucket, hod or scuttle holds about thirty pounds of nut coal. Therefore, if that statement be true, a month of thirty days would call for nine hundred pounds of coal. Calculating the present price of hard coal nut size at fifteen dollars per ton of 2240 pounds, that is six and two-thirds mills per pound, a month's operation of the smallest coal stove may, according to its maker, be expected to call for five dollars and ninety-four cents worth of coal.

Cost of Coal Fires

One of the largest manufacturers of these coal fired generators rates its smallest stove to burn on a twelve hour firing period one thousand and four pounds of coal per month or six dollars and sixty-three cents per month. That is the slowest rate of combustion given, and the inference would be that it is the slowest fire that could be maintained. While that is not the case apparently, still, it is about the slowest rate that will give any considerable amount of hot water. Compare these figures with the water heater bills shown, and in comparing realize that the gas consumptions given include cooking and whatever else gas may be used for the premises covered in the statements.

The electric water heater may be dismissed with a brief mention. Its cost of operation is from seven to ten or more times that of a gas heater and it has not progressed in a commercial way much beyond the experimental stage. It has an appeal to customers who are confusing electricity, efficiency and modernity without much discrimination, but until electric rates come to a point so low as to seem at present impossible, the electric water heater cannot be a general competitor of the gas heater.

Granted or proven then that the appliance is right and its cost of operation low enough for general adoption, does a market exist sufficient to warrant promoting the automatic heater to a major sales activity? After what has already been stated, this question may seem superfluous. The market is here, a latent demand needing only education, is awaiting the call.

To Do It in a New Way

The education of the public is half done. Just as in the start of "Cook with Gas," the problem is not to teach a reluctant public to do something new but

to do something they are already doing in a new way. The public wants hot water. They are getting it after a fashion and in limited amounts. They need be taught only that the gas way to get it is better and cheaper than the old way.

The new homes which are now springing up all over the land are additions to the existing market which should be carefully canvassed. In the old home the investment in the present means of getting hot water is a sales obstacle to introducing a new method. This is not the case in the home under construction.

In the apartment houses a profitable field for automatic service exists. With coal at present prices the smaller apartments can be handled economically by gas, even without in many cases the offsetting credit of dispensing with the labor of attendance on the coal stove. The superior service rendered by the gas heater makes the apartment served by it more rentable. This will be an increasing factor as the housing facilities overtake the demand.

From Sanitation Viewpoint

Another great influence that is spreading the doctrine of sanitation is the widespread and in some states compulsory attention given to this subject in industrial plants. The worker finding his toilet rooms in the plant clean, hot water abundant, baths available when he wants them is becoming ambitious to have these comforts in his own home and the increasing wages of the worker is enabling him to add comforts to his home that previously were impossible.

A most notable and powerful help in marketing water heaters has appeared in the last two years in the shape of an agency organized by manufacturers of plumbing and heating supplies and the various trade associations of dealers marketing these supplies. This agency, known as the Trade Extension Bureau, is undoubtedly one of the finest examples of co-operative trade action yet organized. It teaches the trade practically everything essential from good bookkeeping and office routine to window displays. It has succeeded in making a splendid start in bringing into the dealer or merchant class the trades of plumbing and heating which have been in the past far below the class of merchant in the conduct of these important businesses.

It may seem strange to discuss the entry into the automatic heater business at this time after so many years of handling automatic water heaters on the part of the gas companies, but with so few exceptions as to be negligible it may safely be said that no gas company until very recently has been in the automatic water heater business. They have been merely selling a few water heaters. If they are really going to get the water heater load on their mains they will have to get into the water heater business. That means more than putting a demonstration heater on the floor, generally out of sight, and permitting the manufacturers' representatives to put on a campaign for a short period each year. It means more than a pep talk to the salesmen and a few circulars sent out from time to time. It means going into the business to stay, with a determination to put the idea across to the public. It means that through every employee, the newspaper, display room and show window the gas company will be eternally hammering home to the people the idea of Automatic Gas Hot Water.

EXHIBIT A

Table Showing Grouping of all Customers of Member Companies of American Gas Association

Monthly Gas Consumption	Consumers
Less than 1000 Cubic Feet	35%
1001 to 2000 Cubic Feet	30%
2001 to 3000 Cubic Feet	20%
3001 to 5000 Cubic Feet	10%
5001 to 7500 Cubic Feet	2½%
More than 7500 Cubic Feet	2½%

American Gas Assn., 1922.

EXHIBIT B

Analysis of 25 Companies Supplying a Total of 105,200 Customers in the State of Indiana

Customers Using	%Customers	%Consumption
0 to 1000 Cu. Ft. Monthly	25.2	6.6
1000 to 2000 Cu. Ft. Monthly	35.0	24.2
2000 to 3000 Cu. Ft. Monthly	21.0	22.7
3000 to 5000 Cu. Ft. Monthly	12.8	18.8
5000 to 10000 Cu. Ft. Monthly	4.3	10.1
Over 10000 Cu. Ft. Monthly	1.7	17.6
	100.0	100.0

1922 Report of Rate Committee, Mr. B. H. Gardner, Chairman, Indiana Gas Assn.

EXHIBIT C

Analysis of Gas Sales—Year 1920

A middle states city of about 100,000 population

Group	Cubic Feet	No. of Bills	Percentage of Bills	Gas Consumption cubic feet	Average Consumption per bill	Percentage of Consumption
No. 1	0 to 1,900 c.f.	125,094	49.47%	117,948.9 c.f.	942 c.f.	14.03%
No. 2	2 to 4,900 c.f.	104,322	41.26%	326,694.0 c.f.	3,131 c.f.	48.80%
No. 3	5 to 9,900 c.f.	19,135	7.56%	116,446.1 c.f.	6,085 c.f	17.39%
No. 4	10 to 19.90 c.f.	3,001	1.18%	40.724.0 c.f.	13,570 c.f	6.08%
No. 5	20 and over	1,228	0.53%	67,610.0 c.f.	55,057 c.f.	13.70%
	TOTAL			669,423.0 c.f.	2,648 c.f.	100.00%